Inventory,
Pilot Ops

Rep. No. 3265

corrected 4-10

TABLE 3-1
1983 and 1977 Y-12 MERCURY MATERIAL BALANCE ESTIMATES

Source of Material Inventory and Losses	Task Force (1983)	Case (1977)
VOUCHERED to Y-12:	24,348,852	24,321,000
Returned unopened or rebottled and stored/sold	21,666,348	*
In lithium hydroxide tails, sold and stored	1400	1000
In Building 9201-5 scrap, sold	14,000	10,000
In Building 9201-5 sludge, removed and sold	174,000	111,000
As flasking overage given to GSA	17,212	12,000
In Building 9201-4 equipment, still in place	200,000	*
In sludges and sumps in Alpha-4 Building	250,000	100,000
In Building 9201-2 sewer pipe	800	**
ACCOUNTED FOR Total:	22,323,796	*
Known LOST and NOT ACCOUNTED FOR Total:	2,025,056	2,437,752
Known lost to air	51,300	30,000
Known lost to East Fork Poplar Creek	238,944	470,000
Known lost to New Hope Pond sediment, Chestnut Ridge	6,629	7,200
Known lost to New Hope Pond sediments now in place	8,475	**
Known lost to ground, Building 9201-5 spill accident	49,853	49,853
Known lost to ground, seven other spills	375,000	**
Known lost to ground, Building 81-10 operations	3,000	**
Known LOST Total:	733,201	557,053
NOT ACCOUNTED FOR Total:	1,291,855	1,880,699

* These data are classified for security reasons
** Data not available in 1977 report.

The numbers from the report are not accurate down to the one pound level; the reason for carrying the exact totals is for accounting purposes.

Source: UCCND (1983a).

We really only care about what got off-site and people could get exposure to.

(Table 3-1)

Y-12 mercury material balance[a]

	ChemRisk 1996	Best estimate, Mercury Task Force June 20, 1983		Best estimate, UCC Report June 9, 1977
Vouchered to Y-12	24.3 ⟷	24,348,852	U ~~C~~[b]	24,321,000
Accounted for:				
Returned unopened or rebottled and stored/sold	(includes 81-10 recovery)	21,666,348	S	
In LiOH tails, sold and stored		1,400	S	1,000
In Building 9201-5 scrap, sold		14,000	U	10,000
In Building 9201-5 sludge, sold to "Mallory"		174,000	U	111,000
As flasking overage, "given" to GSA		17,212	S	12,000
In Building 9201-4 equipment, still in place		200,000	U	
In sludges and sumps, Alpha-4		250,000	U	100,000
In Building 9201-2 sewer pipe, at ORNL		800	U	
"Accounted for" TOTAL	22.3 ⟷	22,323,796	C	
Lost or not accounted for:		2,025,056	U	2,437,752
"Lost" to air	72,388	51,300	U	30,000
"Lost" to East Fork Poplar Creek	280,533	238,944	U	470,000
"Lost" to New Hope Pond sediment - Chestnut Ridge ("buried")	6629 ⟷	6,629	U	7,200
"Lost" to New Hope Pond sediments now in place ("buried")	8475 ⟷	8,475	U	
"Lost" to ground, Building 9201-5 spill accident (may not have moved offsite)	424,853 ⟷	49,853	U	49,853
"Lost" to ground, 7 other spills (may not have moved offsite)		375,000	U	
"Lost" to ground, Building 81-10 operations (may not have moved offsite)	3,000 ⟷	3,000	U	
"Lost" TOTAL	795,878	733,201	U	557,053
Not accounted for:	1,229,178	1,291,855[a]	U	1,880,699

[a]The numbers are certainly not known to ±1 lb; the reason for carrying the exact totals here is only to identify the specific numbers for accounting purposes.

[b]Secret, Confidential, or Unclassified in accordance with classification guidance ~~July 1983~~ Dec 1993 (USDOE 1993).

ORGDP from 1944 to 1982.

Openness Press Conference

Fact Sheets

December 7, 1993

DOE 1993

DOE FACTS

DECLASSIFICATION OF MERCURY QUANTITIES FOR OAK RIDGE, TENNESSEE Y-12 PLANT

The Department of Energy has declassified the quantity of mercury used in the Oak Ridge Y-12 plant for lithium enrichment.

SPECIFICALLY:

- The quantity of mercury used for lithium enrichment was 24 million pounds.
- As noted in a 1983 Department of Energy report, about three-quarters of a million pounds of mercury is believed to have been lost to the environment; much into the East Fork of Poplar Creek near the Y-12 Plant. However, incomplete records for that period prevent a fully accurate accounting of the quantities of mercury received, used, and lost to the environment.

BACKGROUND:

- Natural lithium consists mostly of the isotope lithium-7, but contains a small percentage (7.5 percent) of the isotope lithium-6.
- The most efficient industrial-scale process in the United States for enriching lithium in the lithium-6 isotope was the mercury-based Column Exchange (Colex) process.
- Very large quantities of mercury were procured for the Colex process in the early 1950's to make available lithium-6 for use in nuclear weapons and for use in the production of tritium.

(MORE)

U.S. Department of Energy
Office of Public Affairs
Contact: Sam Grizzle
(202) 586-5806

- This declassified information will permit more open discussions with environmental, safety and health interests and the State of Tennessee. While other information does remain classified, we will be working with stakeholders to establish priorities for possible additional declassifications.

- The Department of Energy is cooperating with independent studies conducted by the Tennessee Department of Health to estimate offsite radiation and chemical releases from Oak Ridge and to measure potential health effects upon the plant workforce.

BENEFITS:

- The State of Tennessee had access to classified quantities of mercury; however, the declassification will permit them to make use of those quantities on an unclassified basis and to provide them to the public. The newly declassified information may be of value in reconstructing doses to the workers.

- Declassification of this information may facilitate the conduct of independent public epidemiologic studies related to public and worker exposures that may have resulted from the very large quantities of mercury used during the operation of the plant during the mid-1950's to early 1960's.

- This information is useful in health studies and related activities concerning workers and the community.

- Release of previously secret information should also encourage other nations to declassify similar information.

WHO ARE THE KEY STAKEHOLDERS?:

- The Public. The public living near the site in Oak Ridge has been concerned with the health and safety issues relating to the quantities of mercury used and released to the surrounding area.

- Environmentalists. With this declassification, those interested in migration of mercury off the site can fold this information into their calculations.

- Freedom of Information Act Requesters. The Department of Energy has received Freedom of Information Act requests concerning the Oak Ridge operation. Information on specific mercury quantities, until today, has been denied.

(MORE)

- Health Researchers. This declassification will permit greater public review of information of potential value for epidemiologic or other health studies regarding workers and the community.

- Regulators. Those interested include the Tennessee Department of Health and the Division of Environmental Epidemiology, which is preparing a radiation and chemical historical dose reconstruction.

(MORE)

DOE FACTS

QUESTIONS AND ANSWERS

Q. What benefits will the public obtain from this information?

A. The public will benefit from knowing that independent experts have reviewed this information and that the exposure estimates being used in the study are as accurate as possible.

Q. Will the declassified information permit more accurate estimates of mercury exposure in and outside of the plant?

A. The State of Tennessee was previously provided classified access to this information for use in estimating historical releases of mercury to the environment. The State requested that the information be declassified in order to allow other independent parties to be able to recreate the State's estimates; otherwise, the State believes the credibility of its health study will be threatened. The public will know that other scientists have reviewed this information and determined if they agree with, or can improve upon, the existing estimates being used by the State of Tennessee in their study.

Q. Why were these quantities not released in the past?

A. Historically, most information related to mercury use at the Oak Ridge Y-12 Plant has been classified. In the early 1980's, the quantities of mercury released to the environment were made publicly available, but the total quantity was classified to protect lithium production information from the Soviets. The information released today is the first process-related information judged ready for declassification. In support of the State of Tennessee Health Studies, the Department of Energy is currently reviewing other mercury-related information to determine further declassifications.

(MORE)

Q. How were people affected by exposure to this mercury?

A. A study conducted by the National Institute for Occupational Safety and Health indicated measurable neurologic symptoms (eye-hand coordination, tremors) among workers exposed to the mercury; however, the study detected no life-threatening conditions at the time of its completion. The National Institute for Occupational Safety and Health is initiating a new study to re-examine the workers exposed to mercury. Results of this new study will determine what type of further followup is necessary.

Q. Is this mercury a threat to people now?

A. There is insufficient data to determine whether the mercury is still a threat. Mercury is no longer used in the Y-12 operations. A pilot survey begun in 1984 by the Tennessee Department of Health and Environment and the Centers for Disease Control showed no indication of increased health risks to presumably exposed Oak Ridge residents; however, studies of mercury levels in fish have not been completed. The Tennessee Department of Health and Environment will evaluate risks to the population from the Department of Energy contractor operations in Oak Ridge. The National Institute for Occupational Safety and Health will continue to evaluate health of the worker population exposed to mercury.

Q. What were the environmental impacts and health impacts of spills?

A. In 1984, the Tennessee Department of Health and Environment and the Centers for Disease Control initiated a pilot study to document human body levels of mercury and to determine whether exposure to mercury contaminated soils or consumption of fish presumed to be contaminated with mercury constituted an immediate health risk to the Oak Ridge population. The pilot survey showed no indication of increased risk to the presumably exposed population; however, the results of the fish studies are still in progress.

Q. Is all mercury information now available to the public?

A. No. But we are working with the State of Tennessee to establish declassification priorities. The Department of Energy is dedicated to getting as much of this information out in the open as possible.

(MORE)

Q. The highly enriched uranium inventory at the Oak Ridge Y-12 Plant near Oak Ridge, Tennessee, should be made public. Why not do so?

A. There is a potential proliferation concern. However, we are continuing to review it for possible future declassification.

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HISTORY OF ALLOY DEVELOPMENT PROJECT

1948 Through 1951

For ADP Training Program

One of the first possible uses for an isotope of lithium in connection with AEC projects arose from the property of vast differences in neutron capture cross-section of the two isotopes. The normal abundance of lithium isotopes is 7.2 atom percent Li^6 and 92.8 percent Li^7. The Li^7 has an extremely low neutron capture cross-section while the Li^6 has a very high neutron capture cross-section. This means that in the presence of a neutron flux Li^7 will capture essentially no neutrons, undergo no nuclear reaction, and will not become radioactive. Li^6 on the other hand readily captures neutrons, is converted to tritium, and releases alpha radiation. This low cross-section property of Li^7 made it appear to be an attractive material for use in reactor work (atomic piles).

Late in 1948, it was pointed out that very high purity Li^7 might be a useful material to use as liquid metal reactor coolant or heat transfer medium. It was believed that such a material would be especially applicable to ANP reactors (nuclear aircraft). The degree of purity desired was 99.97 percent Li^7.

With this possible use in mind, work was started early in 1949 on finding a method of achieving the separation of lithium isotopes. This work was done by what is now known as the Materials Chemistry Division of ORNL, under the direction of G. H. Clewett.

Early work included trial of several thousand aqueous-organic and two immiscible-organic systems with an attempt being made to dissolve lithium in both phases of each system. This was a search for a suitable chemical exchange system; the basic principle is that if an element may be distributed between two immiscible phases, and if an exchange takes place between the isotopes of that element in the two phases, then one of the isotopes should show a preference to concentrate slightly in one of the phases. In the vast majority of cases, this preference or shift of isotopes is so small that it cannot be measured and is not of practical value. This was the case in the systems tried in the above early work. This work was carried out mainly by J. S. Drury, A. Clark, and D. A. Lee.

At about the same time, some work was done on separating lithium isotopes by molecular distillation. This principle relied on differences in molecular velocities of Li^6 and Li^7 vapor in a high vacuum to achieve separation. This work indicated that a very measurable separation could be achieved by this method. Results indicated that the single stage separation factor might be [redacted]. (This factor will be defined later.)

The inherent disadvantages of the process were (1) necessity for high vacuum, (2) necessity for relatively high temperature, and (3) low throughput because of the high vacuum. This system was abandoned mostly because of throughput limitations. The work was done by C. C. Haws, M. J. Fortenberry, and G. B. Marrow.

Other separation methods tried included (1) use of cellulose columns, (2) use of ion exchange resin columns, (3) fractional crystallization, and (4) electromigration. None of these systems showed separation of a practical magnitude.

The development of what is now called the ELEX process was an outgrowth of some earlier work reported in the literature by G. N. Lewis and McDonald in 1936. Their work utilized an exchange reaction between Li amalgam and an ethyl alcohol solution of LiCl. A countercurrent column was used with reflux at one end. A very measurable enrichment of Li^0 was achieved. One difficulty with the method was that the amalgam was unstable and tended to react with the alcohol. This, at the time, seemed to make the process impractical from a continuous production standpoint.

The basic system was altered by workers in this laboratory in the following ways: /

/ Co-inventors of this process change were A. Clark, T. B. Waldrop, and [redacted]. M. Leaders.

The basic exchange reaction for the ELEX system is as follows:

(1) Li^7 (amal) $\underset{K_2}{\overset{K_1}{\rightleftharpoons}}$ Li^6 (amal)

where the equilibrium constants K_1 and K_2 are such that

$$\frac{K_1}{K_2} > 1$$

This means that at equilibrium the reaction tends to shift to the right resulting in a slight enrichment of Li^6 in the amalgam phase and a corresponding enrichment of Li^7 in the aqueous phase.

$\frac{K_1}{K_2}$ is also called α (single stage separation factor)

α is further defined as $\frac{\frac{x}{1-x}}{\frac{\quad}{1-y}}$

where x is the mol fraction of one isotope in one phase, and y is the mol fraction of the same isotope in the other phase, when the two phases are at equilibrium.

Therefore, in the case of lithium

$$\alpha = \frac{\frac{Li^6}{Li^7}(amal)}{\frac{Li^6}{Li^7}(H_2O)}$$

Besides the exchange reaction, there is a side reaction which is apparently independent of the exchange. This reaction is:

(2) $Li_{(amal)} + H_2O \longrightarrow LiOH_{(H_2O)} + 1/2\ H_2$

A description of the process flow diagram brings out the following points:

1. Basic streams (H_2O, Hg, amalgam, LiOH solution)
2. Reflux at Li^7 end
3. Reflux at Li^6 end
4. Function of evaporators
5. Purification features
6. Feed, product, and waste stream locations

By the middle of 1950, the bulk of the effort was concentrated on the ELEX process since it had shown the most promise up to that time.

Determinations were made of the following items:

1. Determination of α

   α was determined by two independent methods with triplicate checks made on both methods.

2. Measure of rate of exchange reaction

The rate of the exchange reaction was determined by mixing an amalgam phase containing normal lithium with an aqueous phase containing enriched Li^7. Samples taken at various times during the experiment disclosed the rate at which equilibrium was established.

3. Demonstration of separation in countercurrent cells

The system was run in small scale countercurrent cells with reflux, and the separation was shown to be technically feasible.

Separations are obtained in a countercurrent system by taking advantage of the effect of several stages in series. The manner in which multiple stages give separation is shown in the following:

$$S = \alpha^N$$

where S is total separation in the trough and is defined in the case of lithium as:

$$S = \frac{\frac{Li^6}{Li^7}\text{ (one end of trough)}}{\frac{Li^6}{Li^7}\text{ (other end of trough}}$$

N = number of stages in the trough

A stage may be thought of as the length of trough required to give a $\frac{Li^6}{Li^7}$ ratio at one end the $\frac{Li^6}{Li^7}$ ratio at the other end. This is true only if the system is operating at total reflux. At any finite reflux ratio (finite rate of product withdrawal) the length of a stage will remain constant, but the separation achieved in that stage There is a limit on rate of product withdrawal, beyond which no separation will be achieved in a stage. This is known as the minimum reflux ratio. General practice is to

By early 1951, two new possible uses of lithium isotopes were brought to the attention of the investigators.

1. The du Pont people, who were then ready to start design of the Savannah River plant, had a possible use for

slightly enriched Li^6 (about 25% Li^6). This would be used in the reactors (piles) as a source material for production of tritium. The ELEX process was not far enough advanced at that time to insure production of 25% Li^6. The Savannah river reactors were, therefore, designed to use normal lithium. This use has since fallen into the background.

2. At about the same time, the Los Alamos people indicated that they might have use for quantities of much more highly enriched Li^6. The use to which this material would be put need not be disclosed. Since early 1951, the need for the above material has become definite, and it is toward its production that the ADP program is aiming.

In the summer of 1951, an ELEX pilot plant was constructed in Building 9201-2 in Y-12. It was completed September 1, 1951. This operation was under the direction of H. M. McLeod, Jr.

Early troubles were encountered with insulating tray coatings, solids formation, and impurities. By early November, 1951, the critical problems had been overcome and first data producing runs were made. These first runs established maximum practical throughput and corresponding stage lengths.

The criteria for the production plant to be built in Building 9204-4 in Y-12 were frozen as nearly as possible in December of 1951 because of the urgency of the project. The plant design criteria were based on the above early pilot plant runs.

The plant design is being done by Vitro Corporation of America, and over-all co-ordination of this design and construction is under J. W. Strohecker of Y-12.

Also late in 1951, an alternate process was devised by H. H. Garretson. This is now known as the OREX process and involves an exchange between Li-amalgam and a solution of LiCl

This system then lends itself readily to conventional column type equipment. Because of this feature the OREX system would be much easier to handle than the ELEX system in the separating portion of a plant. However, it would be much more difficult to achieve reflux in the OREX system than it is in the ELEX system.

Both ELEX and OREX processes will continue to receive considerable development effort for possible use in future production plants.

April 13, 1956
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SEPARATION OF LITHIUM-6 AND LITHIUM-7 BY UNION CARBIDE NUCLEAR COMPANY

In 1948, Li-7 metal, with the Li-6 removed because of its low neutron cross section, low melting point, high specific heat, and light weight, was proposed as a heat transfer medium for aircraft reactors. In early 1949, the Oak Ridge National Laboratory, a division of Union Carbide here in Oak Ridge, started basic work in a small way on methods of separating the natural isotopes of Li-6 and Li-7 to obtain 99.97% Li-7.

SECRET

Among the methods considered were:

Electromigration in solutions and fused salts

Fractional crystallization

Molecular distillation

Electromagnetic units

Chemical exchange methods.

It was decided that, if significant separation factors could be obtained, the chemical method was best adapted to low-cost, large scale production. The present state of our knowledge still shows

SECRET

that any other methods are several times higher in cost for both construction and operation. Based on work of Lewis and McDonald at the University of California during 1936, and work on amalgam stability in aqueous systems reported by the Russians, lithium amalgam versus lithium compounds in aqueous and organic phases were tried. Rapid decomposition or transfer of lithium from the amalgam to the other phases made this appear impractical. A counter-balancing emf, or holding current, to prevent this decomposition, using lithium hydroxide solution versus lithium

SECRET

amalgam, was developed by Carbide and patented and became the basis for our Beta-4 Elex Plant. Elex meaning exchange with a counter-balancing emf to prevent amalgam decomposition.

Several hundred systems, using organic versus aqueous and organic versus organic, were tried to eliminate the use of large quantities of mercury, but no separation factors of practical significance were found. Of the chemical methods investigated, only lithium amalgam versus lithium hydroxide solution or lithium amalgam versus lithium compounds dissolved in organic solvents appeared practical.

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Because of difficulties with the reflux mechanisms of the organic versus amalgam system, the aqueous lithium hydroxide versus lithium amalgam proved more practical and is the basis of our present separation plant.

In early 1951, we were approached by Savannah River Operations about the possibility of producing 25% enriched Li-6 for the tritium production reactors to be constructed there. Because all work up to this time had been on a laboratory scale, neither costs nor quantities could be firmed up and SRO was designed to use normal

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lithium. Just recently we have given SRO a test shipment of 95% Li-6 metal. If present calculations are verified, [redacted] for SRO at a savings to them of several million dollars per year. (Dr. Dunnington and Jack Donahue)

Later in 1951, a much more urgent request was received from Los Alamos on the possibility of Li-6 enriched between 30% and 95%. A small pilot plant was under construction and from data obtained here, and with the usual concerted effort for jobs of this type, came our Beta-4 Elex Plant. This plant, originally designed for [redacted] cost about $35,000,000.

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In actuality, by pilot plant and development work, costs here were [redacted] This plant was started in August of 1953 and, with minor alterations costing 3.8 million dollars, produced 10 times design capacity.

While Elex was under design and construction, it was realized that if amalgam decomposition could be controlled without a back emf and difficulties in making and pumping amalgam could be overcome,

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that more conventional industrial methods could be used to substantially lower unit costs.

From a rather intensive effort here at Carbide came our present plants (column exchange or Colex).

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Therefore, [redacted] use of column exchangers became chemically possible.

Problems of pumping and containing amalgam under pressure, of keeping amalgam lines from plugging, [redacted] were overcome and Colex became mechanically possible.

Construction of the first Colex units in the Alpha-5 building were authorized in December of 1953 and operation started January 20, 1955, less than 14 months after authorization. Alpha-4 was

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authorized in June of 1954, and our present Colex system has been in full operation since September, 1955. Modifications, resulting from increased knowledge, have more than doubled a design capacity

(Slides - 1. Colex Process Schematic Flow Diagram)
2. Colex Process)

Present 95% Li-6 production costs are as shown (Slide 3 - Unit Cost per Kilogram of 95% Equivalent Metal).

of higher production, less lithium loss, better electrical efficiencies, and higher liquid throughputs. (Slide 4 - Alloy Capital Expenditures)

Our present Li-6 production schedule calls for all that we can produce for the next 7 - 10 months. We are budgeted for full operation for the next fiscal year.

A planning schedule, Y-12 Top Secret Document Y-1133, with various alternatives and costs has been submitted to the AEC for study. Among the things examined

are full operation for the duration of the feed contracts (3 - 4 years) with subsequent shutdown; partial operation with feed stockpiling, with feed cancellation, etc.

Recently some interest in 99.90% - 99.99% Li-7 has again been expressed and a study, Y-AO-1455, covers this. On a quantity of 40,000 kgs./year and converting one of the five high-assay Colex units to this production using equipment now available, costs would be $70 - $80 per kg. of metal, or only twice the cost of normal metal from commercial suppliers.

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Another possible use for enriched Li-6 includes the hydride for low-weight, high-neutron absorption shields for reactors.

After isotopic separation, we process our lithium from the hydroxide to the chloride, to the metal, and to the deuteride.

(Slides - 5. LiD Production)

6. LiD Fabrication)

The pulverized deuteride is shaped by isostatic pressing, machined, canned in stainless steel, and assembled into TN components.

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We of Carbide are very proud of the successful lithium operation. The entire facilities of Union Carbide, made available to us, were most beneficial in this success. Personal contacts of Mr. Clark Center and others secured much valuable "know how" and experience from private companies that could not normally be obtained. This information resulted in great savings of time and cost.

In summary, the separation process for the isotopes of lithium has been so successful that 95 atom per cent Li-6 metal

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suppliers. Li-7 metal in quantity could now be supplied at 99.97 atom per cent for $80/kg or only about twice the price of normal commercial metal. The facilities of Union Carbide and the cooperation of private industries have helped make our successful separation possible.

Production commitments for Li-6, as now scheduled, will be only 25% of capacity after October of this year (1957). Budget planning allows for full production thru FY 1958 and possibly FY 1959. The fact that all production is not scheduled into weapons could allow

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for large quantities of cheap Li-7, if so desired.

Li-7 can be considered for reactor coolants as the metal, as a salt to give lower melting eutectics for fused salt reactors, or as a reducing agent where low neutron cross section residues are desirable (possibly yttrium - YF_3 + 3Li).

Li-6 can be considered for neutron shielding or other uses.

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Advanced planning with the needs for isotopes of lithium projected for 5 and 10 years, as firmly as possible, will allow decisions to be made on methods of operation or shutdown to give the lowest possible unit costs.

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SECRET

SLIDES -18-

1. Colex Process Schematic Flow Diagram
2. Colex Process
3. Unit Cost per Kilogram of 95% Equivalent Metal
4. Alloy Capital Expenditures
5. LiD Production
6. LiD Fabrication
7. Value of TN Components on Basis of TNT

3-29-57
Distribution:
Copy 1: W. K. Whitson, Jr. (Y-12 RC)

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CHRONOLOGY OF ADP DEVELOPMENT PROGRAM

Note: Beginning with the third quarter of 1949 there was considerable interest in possible use of Li^7 as a pile coolant.

3rd Quarter, 1950	Potential use of Li^6 in weapons program first discussed at ORNL.	Report Y-670
August 31, 1950	Successful multi-stage enriching of Li^6 by Elex process achieved on laboratory scale.	ORNL-858
March 1951	Pre-pilot plant studies made on bench scale models of the Elex troughs.	Report Y-76
April 4, 1951	Dr. Nordheim of Los Alamos met with ORO personnel and indicated that weapons program would require Li^6 within a year. Elex proposed as best method of meeting requirements.	
April 4, 1951	Isotope Separations Committee made preliminary review of possible methods of separating Li^6 from Li^7 on large scale.	
April 19, 1951	Military informs AEC Director of Production of their needs for Li^6 and Li^7.	Memo Gener McCormick Cook, "Req ments for and Li^7
May 25, 1951	ORO requests Washington to allocate $69,000 to build Elex pilot plant.	Memo Woodr to Pitzer
June 6, 1951	Report issued by ORNL which discusses the technical feasibility of Elex as a process to meet military requirements for Li.	YB-30-62 (issued as LXXVI-7)
June 1951	Design of Elex pilot plant 90 percent complete.	ORO Monthl Status and gress Repo
June 1951	One gram of Li^6 and one gram of Li^7 separated by calutron and shipped to Los Alamos	ORO Monthl Status and gress Repo
June 16 and 17, 1951	Princeton Conference on thermonuclear weapons determines that large quantities of Li^6 are desirable for program.	

Put in repos. Chronology 1950-54

July 11, 1951	Isotope Separations Committee meets to review methods of producing Li^6. (Cohn, Urey, Benedict, Kennedy in attendance). Committee recommends, "In view of required need for Li^6 and short time available, a competent design, construction and engineering group should evaluate the Elex process and plans should be made for construction of a full scale plant."	
July 19, 1951	ORO authorizes Carbide to proceed with construction of Elex pilot plant.	Memo Sapirie to Center
August 1, 1951	Construction data sheet for Elex production plant submitted by ORO to Washington. Cost estimated at $4,900,000 on the basis of laboratory bench-scale models.	
August 9, 1951	AEC approves selection of A-E to design Elex production plant.	AEC staff paper 458
September 1951	Elex pilot plant placed in operation.	ORO Monthly Status and Progress Report.
September 24, 1951	Small scale pilot plant work started on dual temperature (OREX) columns as method of separating Li^6.	
September 28, 1951	Requirement for amount of ADP product which would be needed by September 15, 1953, substantially increased.	TWX Cook to Sapirie
October 5, 1951	Estimated cost for Elex plant increased to $9 million on basis of increased requirements.	Memo Sapirie to Cook
October 12, 1951	Directive for $300,000 issued to Vitro for A-E work on Elex plant.	
November 15, 1951	Actual erection of dual temperature OREX columns started on small pilot plant scale.	
November 16, 1951	Carbide issued report which indicates that full scale research on OREX be undertaken.	YB-30-73

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December 3, 1951	Carbide informs AEC that, "data to date insufficient to determine whether this (OREX) offers a means by which even this material (slightly enriched Li^6) could be produced by the Fall of 1953." (Paranthesis and underlining ours.)	Letter Center to Sapirie
December 31, 1951	First runs made in dual temperature OREX small scale pilot plant.	
January 14, 1952	On basis of design study by Vitro revised data sheet for Elex plant in amount of $35 million submitted to Bureau of Budget.	
February 2, 1952	ORO requests Elex Component Testing Facility.	Memo Sapirie to Cook
February 25, 1952	Manson Benedict of Isotope Separation Committee reviews Elex process and comments favorably in report to General Manager and recommends that work continue.	AEC Staff Paper 458/7
March 3, 1952	Elex plant approved. Estimated cost set at $44 million.	
March 26, 1952	Meetings held between representatives of AEC and NPA to expedite materials for Elex plant.	
March 28, 1952	Purchase order placed for for Elex plant.	
March 31, 1952	ORNL reports that OREX dual temperature pilot plant demonstrated small scale feasibility of process, but that numerous problems remained to be solved before OREX could be used for large scale production of Li^6 of desired enrichment.	ORNL Report 1306 (Issued May 16)
April 1952	Overall Elex design 44 percent complete.	ORO Monthly Status and Progress Report.
April 3, 1952	Commission again reviews Elex process and on basis of Benedict evaluation re-affirms decision to continue design and construction of Elex plant.	AEC Staff Paper 458/8

June 1952	Elex plant construction 3 percent complete.	ORO Monthly Status and P gress Report
July 1952	Cascade dual temperature OREX development dropped as not having sufficient promise	
August 1952	Decision made to build OREX chemical reflux pilot plant.	
August 4, 1952	$3,100,000 granted for full scale OREX development work.	Letter Sapir to Center
August 27, 1952	ORNL Report estimates cost of OREX chemical reflux facility capable of producing quantity of Li^6 per day at $35.5 million.	ORNL-CF-52-8 147
October 6, 1952	Design work started on OREX test facility.	ORNL Report CF-4-123
December 30, 1952	Preliminary economic study indicates that an OREX production plant capable of producing of Li^6 a day would cost about $24.8 million for a dual temperature facility; $18.4 million for a chemical reflux facility.	Vitro Report on job 50-E
January 1953	Elex Component Test Facility started up.	
January 1953	Informal advice from Carbide indicates that Colex appears economically feasible for large scale Li^6 production.	
January 25, 1953	Began construction of OREX test facility.	
February 1953	2" column Colex test facility placed in operation.	
April 28, 1953	OREX chemical pilot plant turned over for operation.	
April 1953	3" column Colex test facility placed in operation.	
June 30, 1953	Formal feasibility report issued which describes Colex process as economically feasible for large scale Li^6 production plant.	Report Y-988
July 27, 1953	President signs FY 1954 appropriation carrying $145,000,000 for second ADP.	PL 149 83rd Congress

August 18, 1953	First half of Elex cascade plant placed on-stream.
October 1953	Alternate process for producing Li^6 evaluated. On basis of evaluation by Carbide decision made to use Colex process in second ADP. OREX development to continue.
February 1954	12" Colex column test facility placed in operation.
March 8, 1954	Y-12 OREX pilot plant shut-down as a result of failing to achieve maximum enhancement of material.
March 15, 1954	The Colex test loop for testing plant sized pumps was placed in operation.

CHRONOLOGY OF ALPHA-5 PLANT

November 2, 1953 — Started dismantling and removal work on Building 9201-5.

November 3, 1953 — Established AEC field offices in Building 9723-16.

Held meeting in Oak Ridge with Mr. Widmeyer and Mr. Mann of Washington. Gave orientations of the general planning and progress to date on the Alpha-5 Project.

Forwarded draft of Appendix A of the Catalytic contract to Philadelphia.

November 4, 1953 — Held meeting in Oak Ridge with representatives of Blaw-Knox, Mathison Chemical Corp., Carbide, Catalytic, and Rust. Determined that it would be necessary for Blaw-Knox to perform engineering design on the absorbers prior to any negotiations for a fixed price order.

Agreed with representatives of Carbide that a solid nickel bottom for the absorbers would be used. Expressed the intention to negotiate total nickel requirements with Tull Metal Supply Co.

November 5, 1953 — Started negotiations for the nickel requirements in a meeting held with representatives of Tull Metal, Catalytic, Carbide, and Rust.

Approved Rust's purchase order authorizing Blaw-Knox to perform engineering design on the absorbers.

November 6, 1953 — Discussed with Carbide the general features of Alpha-5 work in existing Y-12 facilities to be performed by Carbide.

Authorized the selection of a new A-E specialized in steam plant design. Authorized a preliminary contact with Burns and McDonnell to investigate their availability for work.

Completed Appendix A to the Rust Letter Contract, with all negotiations very favorable to the Commission.

November 9, 1953 — Experienced work stoppage when substantially all of Rust's crafts respected sheetmetal workers' picket line as a result of the travel pay in question on the Maxon job.

November 10, 1953 — Met with representatives of Burns and McDonnell. They indicated willingness to accept contractural terms similar to those used on the Portsmouth job. Held advance general discussions with representatives of Carbide and Burns and McDonnell concerning the steam plant investigation and design.

November 11, 1953 — Held negotiations for the solvex pumps with representatives of the vendor, Catalytic, Rust, and Carbide. Discussions were held on security, delivery, price, and technical problems.

Rust completed price negotiations with Tull Metal and Supply Company for total nickel requirements for all absorbers, approximately 477,000 pounds. Obligated $490,967.

November 12, 1953 — Ordered solvex pumps from Robbins & Meyers. Obligated $400,000.

November 13, 1953 — Met with International Nickel and Lukens, at Lukens in Coatesville, Pa., to work out production problems on supplying large nickel sheets for absorber bottoms.

November 16, 1953 — Carbide completed removal of stored equipment and turned over the west half of building 9201-5 to Rust for stripping.

Started negotiations with Allis-Chalmers covering revamping of M-G sets for 9201-5. Meeting was attended by representatives of Carbide and Rust.

November 17, 1953 — Executed Letter Contract with Burns and McDonnell for steam plant design for entire Y-12 Area for $25,000. (Changed to a definitive contract for $176,000 on February 25, 1954).

November 18, 1953 — Reviewed Catalytic's procedures and schedules.

November 20, 1953 — Outlined the general arrangement of the columns in Alpha-5. Proposed suggestions for resolving Catalytic Appendix.

November 23, 1953 — Rust crafts reported back to work.

Reached agreement of all provisions of the Catalytic Appendix.

Core drilling and soil analysis work was started on the proposed steam plant site by the Corps of Engineers.

November 24, 1953 — Met with Blaw-Knox in Pittsburg, in a meeting attended by representatives of Carbide and Catalytic, to discuss absorber design, nickel requirements, detail changes, and general problems. The engineering progress to date is good.

November 27, 1953 — Forwarded the revised draft of the Rust definitive contract to Rust for review.

Transmitted the classification of accounts for the Alpha-5 Project to Mr. Cook, Washington.

November 28, 1953 — Approved Reimbursement Authorization No. 2 of Appendix A and forwarded to Catalytic.

December 1, 1953 — Determined the feasibility of using an artificial soil-stone fill for the steam plant rather than drilled-in-place piling.

Rust increased the Blaw-Knox purchase order for engineering on the tray design from $10,000 to $18,270.

December 2, 1953 — Informed Washington representative that tentative construction schedules were being prepared for use in briefing the General Manager on December 9.

December 3, 1953 — Authorized Catalytic to work an extended 48-hour workweek.

Oriented representatives of Rust on the scope of stripping the Beta-2 building. Carbide agreed to make the building available for stripping by January 4, 1954.

December 7, 1953 — Obtained agreement by telephone from Bethlehem Steel Company to deliver 600-T of fabricated structural steel within seven weeks with an option for 600-T more in 30 days. A meeting was scheduled for December 9.

December 8, 1953 — Discussed the feasibility of placing the . Advised Catalytic that the maximum load to be considered was

Reviewed the preliminary proposal for the steam plant with Carbide and Burns & McDonnell. Engineering work in the proposal was excellent.

Handed comments on Catalytic's schedules to their representatives. Estimated that Catalytic would require about three weeks to analyze the comments and to supply new schedules. Catalytic agreed to get out footing details for the new structural columns below the west high bay area at an early date.

Change No. 1 to the nickel order with Tull increased the order by approximately $119,000.

December 9, 1953 — Signed Directive Y-12-101A, replacing Part I and Part II of the original directive and authorizing the steam plant design and construction and the Alpha-5 construction work.

The last cubicle was removed from 9201-5.

Met with Bethlehem Steel in Bethlehem, Pennsylvania, to negotiat for the steel required on a crash basis for the structural port of the job. Rolling on certain sections were started by midnig The shipment was to be completed by February 1, 1954.

December 10, 1953	Made decision to use pulverized coal as a primary fuel at the new Y-12 Steam Plant because it is more economical on the basis of current gas and coal costs.
December 11, 1953	Reached agreement with Rust upon the long form purchase order or purchase contract. Discussed the retrospective insurance plan.
	Drilling of core holes at the Steam Plant site was completed.
	Received proposal from Bethlehem Steel to provide 661 tons of fabricated steel at $193 per ton with a maximum escalation of $3.00 per T for initial shipment. Purchase order was issued.
December 12, 1953	Rust increased the Blaw-Knox purchase order for engineering to a total of $29,000.
	Received Allis-Chalmers' proposal for modification of 8 M-G sets.
	Received revised preliminary proposal from Burns & McDonnell.
December 14, 1953	A 11-ton M-G rotor was dropped while it was in the process of being loaded onto a flatcar. Considerable damage was done to the rotor, flatcar, and floor of the Alpha-5 Building.
	Reviewed the Allis-Chalmers proposal for the modification of the existing M-G sets with representatives of Allis-Chalmers, Carbide and Rust. Additional information was requested from A-C.
December 15, 1953	Representatives of the Ohio River Division Laboratories of the Corps of Engineers inspected the Steam Plant site and the Alpha-5 extension. They discussed the initial results obtained from soil analysis at the laboratory.
	Gave a general briefing of status of Alpha-5 work to a representative of the Construction and Supply Division, Washington.
December 16, 1953	Recommended to the Director of Production, Washington, that authorization be obtained to start the expansion proposed by the Planning Committee at the meeting in Washington December 14 & 15.
	Reached tentative agreement with Carbide for the location of additional capacity of the plant in Alpha-5 Building.
December 21, 1953	Agreed with representatives of Catalytic and Carbide that the capacity for the Alpha-5 project could be increased without delaying the target on-stream for the first cascade.
	Concurred with Carbide's view that all concentrate and fabricati facilities should be installed in Beta-2.

December 22, 1953 — Set up an advance planning organization composed of five Rust representatives and two Commission representatives to outline the construction plant necessary to handle the increased capacity.

Completed negotiations with Allis-Chalmers for limited reconditioning and revamping eight M-G sets and furnishing certain items of control equipment at a total estimated cost of $517,972.

Issued Supplement No. 3 to Rust Letter Contract AT-(40-1)-1666 and increased the obligation thereunder from $25,000,000 to $45,000,000.

December 23, 1953 — Received word that the Commission had authorized a fifty percent expansion of the Alpha facilities and the design of comparable capacity, including the increase for Alpha-4.

December 24, 1953 — Rust issued a letter of intent to Blaw-Knox for the design, fabrication, and furnishing of 60 trays for approximately $2,148,000 The vendor is limited to $100,000 for design, 5% overhead, and 5% pro

Concluded that Catalytic probably could design Beta-2 facilities faster than Vitro because of their studies on Alpha-5, provided they had adequate manpower.

December 28, 1953 — Gave verbal notification to Rust to proceed with all work necessary for the construction of the fifth and sixth lines (to go in Beta-2)

Increased obligation to Catalytic under Phase II to $900,000.

December 29, 1953 — Set up advance planning for lines seven through twelve. Rust agreed to increase engineering personnel.

Advised Catalytic of the change in program, adding the fifth and sixth lines and Beta-2 facility. Catalytic furnished information to show adequate over-all manpower to handle the design and was authorized to proceed with the design of these items. Carbide was requested to release design criteria on Beta-2 to Catalytic as fast as possible.

December 30, 1953 — Received assurance from Rust that additional personnel would be made available if they should be authorized to build lines 7 through 12.

December 31, 1953 — Authorized Rust to use the east half of the west track area of Alpha-4 for its construction activities. The balance of Alpha-4 is to be held open for lines seven through twelve.

January 4, 1954 — Received Building 9204-2 from Carbide. Stripping was started.

Placed order with Buffalo Pumps, Inc., a "proven source", for the eight solvent pumps at a cost of $180,680.

January 5, 1954 — Determined, in conjunction with the Ohio River Division Laboratories and Burns & McDonnell, that piles will not be required for the foundation for the Steam Plant.

Opened bids on three generating units for the Steam Plant. The Wickes Boiler Company bid of $1,357,916 was low of five received.

January 7, 1954 — Held meeting in New York with INCO to clear up problems concernir the rolling of the large nickel sheets to meet the Alpha-5 requirements.

January 13, 1954 — Made inspection of the production facilities of Wickes Boiler Company in Saginaw, Michigan. Determined that a well organized engineering and production facility is in operation.

Met with Bethlehem Steel Company to negotiate approximately 700 tons of steel required for lines five and six column supports and for tray supports for the first six lines. Rolling of steel was scheduled to start January 18 and to be complete by February 7. Shipment of fabricated pieces was scheduled to start by March 1 and to be complete by March 15.

January 15, 1954 — Reviewed progress and plans of Beta-2, Alpha-4, and Alpha-5 with a representative of the Construction and Supply Division, AEC. Determined that neither the Beta-2 Building nor the 9212 facilit would be of sufficient size to contain all of the required fabricating facilities for the product. Furnished Carbide with figur that will determine the scope and size of any new building that should be built.

January 18, 1954 — Rust started actual construction on the Steam Plant. Harrison Construction Company signed subcontract for and started work on excavation of the Steam Plant area. Agreed to place the special compacted stone fill in five weeks.

January 19, 1954 — Held meeting with Carbide to develope scope of fabrication facilities for Beta-2 and 9212 expansion for case I and II. Proposed figures on various sized facilities were furnished to Cook in Washington by telephone.

January 20, 1954 — Advised Allis-Chalmers that twelve M-G sets would require rehabilitation in lieu of eight, and that delivery of the twelve was desirable on same schedule as promised for the eight.

January 20, 1954	Received verbal authorization to proceed on Case I program for the Beta-2 facility, with basic planning and common auxiliaries for Case II.
	Rust started working a second shift to accelerate construction.
	Negotiated with Bethlehem Steel Company to deliver approximately 420 tons of steel required for Steam Plant by March 15.
	Opened bids on 25 sets of 13.8-kv switchgear. Brown-Boveri Corp. of Switzerland bid, $172,000 F.O.B. Oak Ridge, was low of four bids received.
January 21, 1954	Rust modified Buffalo Pump, Inc., purchase order for four additional pumps to be delivered by August 1954.
January 22, 1954	Completed negotiations with Kinney Manufacturing Company in the amount of $562,332 for the raffinate pumps. Schedule is good.
January 23, 1954	Alpha-1 Building was transferred to Rust for stripping operations
	Reviewed primary power distribution in Y-12 with Sargent and Lun
January 26, 1954	Reviewed the expansion requirements necessary to meet the weapon schedule with Carbide. A two-story addition to 9212 will be required for this expansion.
	Opened bids for coal handling equipment for the Steam Plant. Link-Belt was low bidder at approximately $100,535.
	Burns & McDonnell reviewed the Steam Plant site and discussed preliminary structure and equipment layout.
January 27, 1954	Sent a proposed staff paper on expansion requirements to Washing
January 28, 1954	Approved order to Link-Belt for coal handling equipment.
	Gave Rust further indoctrination in the type of work to be performed in the Beta-4 facilities.
January 29, 1954	Ohio River District Laboratories of the Corps of Engineers start core drilling west of 9212 and west of the Beta-4 Building.
	Catalytic agreed to assign 375 employees to the Alpha-5 and Beta Projects by March 1.
January 30, 1954	Rust issued telegraphic order to Allis-Chalmers, the No. 2 bidde for the 13.8-kv switchgear required for the 6-line plant. Order for approximately $233,155 was made to the No. 2 bidder at the direction of the General Manager.

CHRONOLOGY OF ALPHA -5 PLANT

February 1, 1954	Harrison Construction Company started placing crushed stone fill for the steam plant.
	Obtained authority to lease 16,000 sq. ft. of additional office space in Philadelphia for use by Catalytic.
	Construction canteen opened by the Oak Terrace of Oak Ridge.
February 2, 1954	Reviewed availability of Giffels & Vallet for design of 9212 expansion.
	Submitted Supplement No. 2 to Contract AT-(40-1)-1359 to Sargent and Lundy for signature.
February 3, 1954	Opened bids on the columns and the water softene
February 4, 1954	Concluded negotiations with R.&I.E. for aluminum and copper bus (60,000 amp. D.C.) for six lines in Building 9201-5.
February 6, 1954	Selected G&V to design 9212 extension (Building 9998). Work beg
February 9, 1954	Rust truck drivers returned to work following a one-day walk off
	Discussed columns with low bidder, ALCO.
February 10, 1954	Lines 7 and 8 authorized by Director of Production; funds for Alpha-5 increased to $155,100,000; quantity of solvent pumps increased to
February 11, 1954	Finalized Blaw-Know contract on the basis of 60 trays.
February 12, 1954	A representative of Rust's home-office visited the site to give over-all administration to organizational work.
	Placed order for $113,520 with Bethlehem Steel Company for the structural steel for the boiler house, to be shipped by March 19
	Sargent & Lundy started A-E studies for the 154-kv and 13.8-kv power distribution system serving the Y-12 Area.
February 13, 1954	Carbide started moving equipment from the east half of Alpha-4 to make space available for construction of lines 7 and 8.
	Gave preliminary briefing to Rust concerning participation in the 9212 expansion.
	Discussed cleanliness control design in detail with representatives of Rust, Catalytic, and Carbide.

February 15, 1954 — Sent contract for exchange columns to ALCO for signature, in the amount of $771,624.

February 16, 1954 — Determined that the principal participants with Blaw-Knox in the tray fabrication were qualified to perform the work on schedule.

Drilling operations in the area completed by Corps of Engineers.

Representatives of DSBA and NPA visited Oak Ridge concerning boiler fabrication.

Determined that Burns & McDonnell had manpower to design a fourth boiler in the event it is required.

February 17, 1954 — Reached agreement with Blaw-Knox on price of $3,265,286 for 60 trays.

Authorized Burns & McDonnell to design a fourth boiler immediately. Authorized Rust to construct the boiler on a schedule comparable to the first three.

February 18, 1954 — Excavation began in the 9212 area.

Reviewed Rust's pre-employment checks. Apparently insufficient information is available on a number of Rust's employees.

Determined that an increase of approximately will be required in the total load on the Y-12 electric supply when Alpha-5 (Case II) is complete.

February 19, 1954 — Excavation of footings for the steam plant was begun.

February 22, 1954 — Determined that carbon steel bottoms would be used for all future tray design, the nickel on order will be used for other purposes.

February 23, 1954 — Increased Catalytic Letter Supplement, AT-(40-1)-1520, from $900,000 to $1,400,000; definitive supplement date extended to 3/31.

February 24, 1954 — Scheduled shipment of steel by Bethlehem Steel for Building 9998 to begin by 3/22/54 and to be complete by 4/20/54; all fabricated steel for boilers and bunkers to be in Oak Ridge by 4/20/54.

February 25, 1954 — Made award of $403,250 to Buflovak for the double effect evaporators, following a detailed analysis of operating costs made by Catalytic and Rust.

Acquainted TVA with anticipated power requirements for Alpha-5.

February 26, 1954 — Laboratory control of fill in steam plant area completed by Corps of Engineers.

Issued Burns & McDonnell Letter Supplement, AT-(40-1)-1671, for Title I through IV services on the Y-12 steam plant, effective as of 4/10/54: Agreed upon April 10 as date for definitive supplement.

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CODE WORDS

October 29, 1962

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WORDS	DEFINITIONS
ASPEN	Lithium Stearate ~~CONFIDENTIAL~~
BENGAL	
BOLL	
BRANDY	
BRANDYWINE	Refers to the program for the recovery of
COTTON	
GANNET	Gannet Program (LRL)
IVANHOE	Test detonations planned to begin
JAVA	
"K"	
MARBLE	Lithium Seven (Li^7)
MOON	
POKE	for RFFO
SPRUCE	Production and processing of

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UAL	Fabrication of
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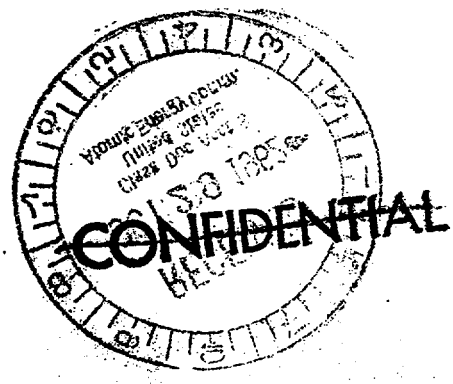

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Date: 1-13-95

M-473
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NOTICE

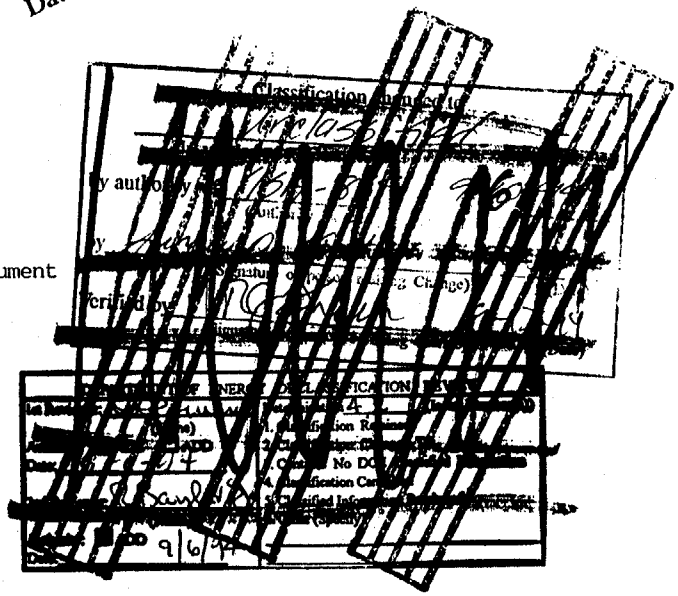
The Y-12 Classification Office has determined that this document does not contain any Y-12 classified information. However, the document remains CONFIDENTIAL-RD pending DOE Office of Declassification review.

January 13, 1995.

MERCURY TASK FORCE
MATERIAL ACCOUNTABILITY DATA
JUNE 1983

Compilers Note:

Although many of the pages in this document are unclassified, the document is a complete compilation of data from which the total quantity of Mercury Acquired by Y-12 can be calculated.



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R. J. Fraser
Y-12 Classification Specialist

1-13-95
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Initials Date
Prepared by HV 6-27-83
Approved by

Mercury Task Force
Review of GSA Files, Washington, D.C. - INDEX
June, 1983

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L.L. McCauley
Sr. Staff Manager
HSE Division

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Prepared by [illegible] 6-2
Approved by

UNCLASSIFIED

Mercury Task Force
Summary - Review of GSA Files - Washington, D.C.
June, 1963

Purpose: To review GSA files in an effort to establish the total number of pounds of mercury procured and transferred to AEC for the lithium isotope separation program.

Scope: All available GSA files relative to mercury in Washington were reviewed. Copies of correspondence, recs reports, and certain other data considered pertinent were obtained.

Findings: 1. The letter of July 12, 1963 from Seaborg to Aspinall refers to Presidential authorization from Pres. Eisenhower to the Director, Director, Office of Defense Mobilization dated 7-7-54, 1-25-55, 8-12-55, 5-10-56 & 7-28-59, authorizing the use of stockpile mercury. The letter states that AEC returned a portion of the advanced mercury to the stockpile, some by transfer and some by GSA purchase for AEC's account. However, the balance of the advanced mercury held by AEC was later transferred to AEC when the objective for stockpile mercury was reduced. The amount transferred was probably 217,955 flasks

SECRET

Initials Date
Prepared by
Approved by

Mercury Task Force

HLM 7-7-83

UNCLASSIFIED

(176,781 plus 41,174 flasks) ~~I-1~~ (II-11) II-12-1

This number of flasks was referred to in several instances. From this it appears that all loaned mercury was returned or replaced by purchase except for the 217,955 flasks.

(2). General inspection reports denoting problems with leaking mercury flasks were obtained. Such provides some support relative to whether VACND actually received the quantity as reflected on AEC transp vouchers. IX-3-1/8

(3). As of 1-5-1966, a GSA Report of AEC Excess mercury denotes transfers, sales, and donations as follows: IX-3-1

	Flasks	
Transfers for AEC Use	3949	IX-3-1
Transfers for Use-other federal agencies	9542	
Transfers to GSA-DMS Stockpile	55359	
Donations to states	10345	
Sold for AEC by GSA	124323	IX-3-4
Current mercury inventory-GSA & DOE	84275	II-2a
Transfer to stockpile in Jan & Feb, 1957	13750	II-2a
Less GSA stockpile inventory at 7-12	(20276)	VI-1-A
TOTAL	281267	
Total pounds 281,267 x 76 =	21376292	
Total bottled & shipped per TT	21666384	
Difference	290092 pounds	

SECRET

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Mercury Task Force HRM 7-7-83

The above schedule was prepared in an effort to reconcile sales + transfers + the current inventory to mercury bottling records. The difference amounts to 290,092 pounds or 3817 flasks (290,092 ÷ 76 = 3817) while we cannot account for the difference of 3817 flasks, we feel that such gives credibility to the bottling records. While several possibilities which would account for the difference exist, I feel that it is very likely that some could have been returned to the stockpile but not reflected in the above reconciliation.

(4) General receiving reports (Hg. being received by GSA including transfers from one depot to another) were collected. Many exceptions are recorded on these documents denoting leaking and empty flasks.

(5) Mercury quota and procurement data including lots of DMP correspondence relating to mercury procurements in 1952-1954 period.

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Mercury Task Force HVM 7-7-83

(6) GSA inventory report which denotes 20,276 flasks of GSA mercury in storage in Oak Ridge. This agrees with Y-12 records of GSA mercury. II E-4

(7) Presidential Releases - National Stockpile Program, March 31, 1983. This reports two releases; 5-10-56 release of 176,781 flasks and 7-28-59 release of 41,174 flasks. Excerpts were copied from a classified document which denoted warehouses where the mercury was located prior to transfer to AEC. II 10-1 II 10-2

(8) Data on stockpile mercury was obtained in hopes of determining the quantity procured by GSA for AEC, plus shipments from the stockpile for AEC. Other sources were probably not shown and from all indications this data does not provide sufficient information to determine total GSA mercury shipped to AEC by GSA. II-11

~~SECRET~~

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Mercury Task Force HVM 7-7-83

(9) These are GSA Stockpile worksheets. Mrr Long of the Washington, D.C., GSA office located these in his efforts to locate data which would provide total loans and procurement data relative to mercury shipped to AEC. The data does not provide sufficient information needed to form any conclusions; however the presidential Release quantities corresponds to other such information.

Conclusion: Considerable information of a general nature including documents indicating leaking flasks, etc. References to Presidential Authorizations for release of GSA Stockpile mercury is informative but does not provide any conclusive information relative to total shipments of mercury to AEC, Oak Ridge.

~~SECRET~~

OAK RIDGE Y-12 PLANT INFORMATION CONTROL FORM

DOCUMENT DESCRIPTION (Completed By Requesting Division)

Document No.	Author's Telephone No.	Acct. No.	Date of Request
MS/ChR2-0167	6-0263	23660003	8/9/95

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Author(s) Requestor: Steve Wiley

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M-780 CONFIDENTIAL JUNE, 1983

Y/HG-C389 "MERCURY TASK FORCE

MATERIAL ACCOUNTABILITY DATA "(U)

Data in this folder contains copies of pertinent papers supporting mercury acquisitions, and data denoting the disposition of mercury when it was drained from the system and bottled.

The index contains the number assigned by the MTF (M-numbers) where the record copy of the document is ~~created~~ located. Copies of the documents were made and are included in this file. The work paper page numbers are entered in red in the index.

CHARLES DOTY

HERSHEL MCCOLLUM

CONFIDENTIAL

Mercury Task Force — HVM 7-13-83

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Mercury Task Force — HVM 7-15-83

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Unaccounted for

Did not get 24,325,352

Losses in scrap sales (3,000,000 lbs. pipe, etc.)

Losses in ~ 200,000 old flasks scrapped

Conservative losses to ground

Still in building structure

(Paint, floor, insulation adhered to metal)

Unrecorded losses to ground:

- Leakage ~~through~~ concrete sumps to ground
- Losses during transfers of equipment.

Thefts

FOOTNOTES

(1) Following a reconciliation between quantities shown as received or vouched on the June 9, 1977 report and such quantities on the 1983 Mercury Task Force Report:

DATE AND SOURCE		QUANTITY JUNE 9, 1977	DIFFERENCE INCREASE (DECREASE)	QUANTITY 1983
5-54	54-5-305	1,457,067	- 0 -	1,457,067
5-55	55-5-564	10,000,000	- 0 -	10,000,000
5-55	OREX-2900-525	225,948	(225,948) (a)	- 0 -
6-55	55-6-621	2,400,000	- 0 -	2,400,000
6-56	56-6-395	1,693,660	- 0 -	1,693,660
8-56	56-8-285	4,986,632	- 0 -	4,986,632
10-56	56-10-133	3,412,781	- 0 -	3,412,781
5-59	D-1894-Y	39,050	(39,050) (b)	- 0 -
12-62	03787	106,026	(106,026) (b)	- 0 -
1-56	56-1-720	- 0 -	375212 (c)	375212
		24,321,164	4,188	24,325,352
ROUNDING		(164)	164	- 0 -
TOTAL (POUNDS)		24 321 000	4352	24,325,352

(a) Mercury was charged to OREX from the Y-12 inventory. Inclusion of material received on AEC transfer vouchers and charged to the OREX Project should not be included in receipts when transferred back to Y-12. Such results in double counting.

(b) The 39,050 pounds and 106,026 pounds are adjustments to reduce quantities written off in fiscal years 1959 and 1963 respectively. These quantities should not be included in receipts.

(c) This quantity from the AEC Transfer Voucher 56-1-720 was not included in the 6-9-1977 Report.

(2) The June 9, 1977 Report included the following quantities of mercury in flasks and facilities:

Quantity bottled prior to 1977	14,149,288 pounds
Book inventory of mercury in process equipment in 9201-4	
Estimated error in book inventory	100,000
Less:	
Error in listing quantity bottled in the July, '64 to May, '65 bottling campaign. The 6-9-77 Report included 718,352 pounds dumped from old flasks and re-bottled in new flasks.	(718,352)
Other apparent errors in the quantity shown as bottled prior to 1977 which were were unable to identify	(209,512) (927,864)
TOTAL BOTTLED TO DATE	

(3) The 12,000 pounds estimated overage in filling flasks was based on an average of 1 ounce over in each of 186,174 bottles filled prior to 1977. The procedures specified that each flask be filled with a minimum of 76 pounds of mercury. The maximum was to be 76 pounds plus two ounces. Flasks tested revealed an average weight of approximately 76 pounds and 1 ounce. In 1983 data is based on a total of flasks filled to date, and with an average of 76 pounds and one ounce in each, the overage in billing would be pounds for an pound

(5) Sludge containing mercury was sold to Mallory Battery Company in 1972. VCCHD did not have an economical way to determine the weight of mercury in the sludge because of variations in the composition of the material and the large quantities of sludge sold. The 111,000 pound estimate used in the 1977 Report was based on the best information available. Current estimates are that Mallory extracted 174,000 pounds of mercury from the sludge. Efforts to obtain data from Mallory to document this were to no avail because all records during this period related to the mercury recovery operation had been destroyed. VCCHD Property Sales (Don McCammon) did locate one of the Mallory employees involved in the mercury recovery operation. The Mallory employee involved in the operation was not able to supply production or other records to prove the exact quantity; however, he did state to the best of his memory approximately 174,000 pounds and possibly more of mercury was recovered from mercury containing sludge.

(6) The 1977 Report did not include mercury contained in lithium tails which was sold back to suppliers of the virgin and to others. Inclusion of this material increases the total to 115,000,000 pounds which contained approximately 12 parts mercury per one million pounds of material. (12 x 115 = 1380 or 1400 pounds).

(7) Estimated Hold ups in 9201-4 Salvage
Increased due to additional data obtained

(8) Estimated Hold Up in 9201-4 Equipment
Increased due to additional data obtained

Mercury Task Force S-1335 HVM 7-12-83
Organization Chart - Alloy Div.
7-1-56

Y-12 ORGANIZATION CHART
ALLOY DIVISION

D - Deceased
Q - Quit
R - Retired

ASST. PLANT SUPERINTENDENT
G. A. STRASSER

ALLOY
R W. K. WHITSON, Jr.

Shift Supt.

SHIFT GEN. - FOREMEN
A G. H. SMITH
B R C. W. FRAZIER
C D G. A. CROOMS
D D E. M. FOSTER
R D R. W. BROTHERS

BETA 4 STAND-BY
J. E. SMYRL
J T. S. HIGGINS

COLEX AUXILIARIES
D. A. JENNINGS
R A. C. NEELEY
A. J. CAPUTO ORNL
D. W. SMITH

ALPHA 4 OPERATION
NEAL DOW
Q W. T. CROW - NRC, D.C.
Q J. W. LEMERMAN
R J. W. ELLISON
W. H. HUBBS
D H. C. MORGAN

ALPHA 5 OPERATION
G. W. EVANS
Q J. B. STRICKLIN, Jr.
Q P. E. TAUSCHE
J. F. LIAFSNA

R L. M. McLAUGHLIN

RECRYSTALLATION
W. M. WILLIAMS
A ? A. P. BROWN
B J. H. WAKEFIELD
C R P. J. CONERLY
D L. C. LASHER ORNL

EAST CASCADE
R. B. ELLINGSON
A W. RAY
B D E. F. FLEISCHMAN
C R L. V. THORNTON
D G. D. MOWERY
R Q A. F. GILLEN

UNITS 1, 1A, & 2
J. N. TURPIN
AR P. J. BERTIN
B T. W. ROBINSON
C G. R. GUINN
DR W. R. FLOYD
R J. E. McNABB

FEED PURIFICATION AND EXTRACT
A E. H. JOHNSON
B D D. J. OWENS
C R H. R. ELLIS
D J. L. MINTON
R A* J. G. BYRD

WEST CASCADE
R A S. E. PELIZZARI
D B P. D. QUINLEY
R C K. C. BLANKENSHIP
D H. T. GREENE

UNITS 3 & 4
E. A. TWEED
AR H. W. GRUBB
BD L. E. O'DELL
CR C. C. VERBOOM
DR K. E. KAHLEY

EVAPORATORS AND DEMINERALIZERS
A ? C. J. BOWERS
B R A. K. SELF
C Q W. G. RAINS
D D C. S. MELTON
P R* J. G. BYRD

PROCESS LABORATORY
D L. S. SKEEL
D. M. CLEVELAND
H. H. CAUDILL
J. J. ASBURY
Q S. J. FROST
AQ M. H. SHANKS
B G. A. BURTON
CQ D. C. CONASTER
D J. D. FRANKLIN

UNITS 5 & 6
F. C. CHILDRESS
A C. E. WUEST
BR T. L. HART
CQ S. L. SULLINS
D? B. W. GARRETT

F. B. Tillson
R J. W. Ebert

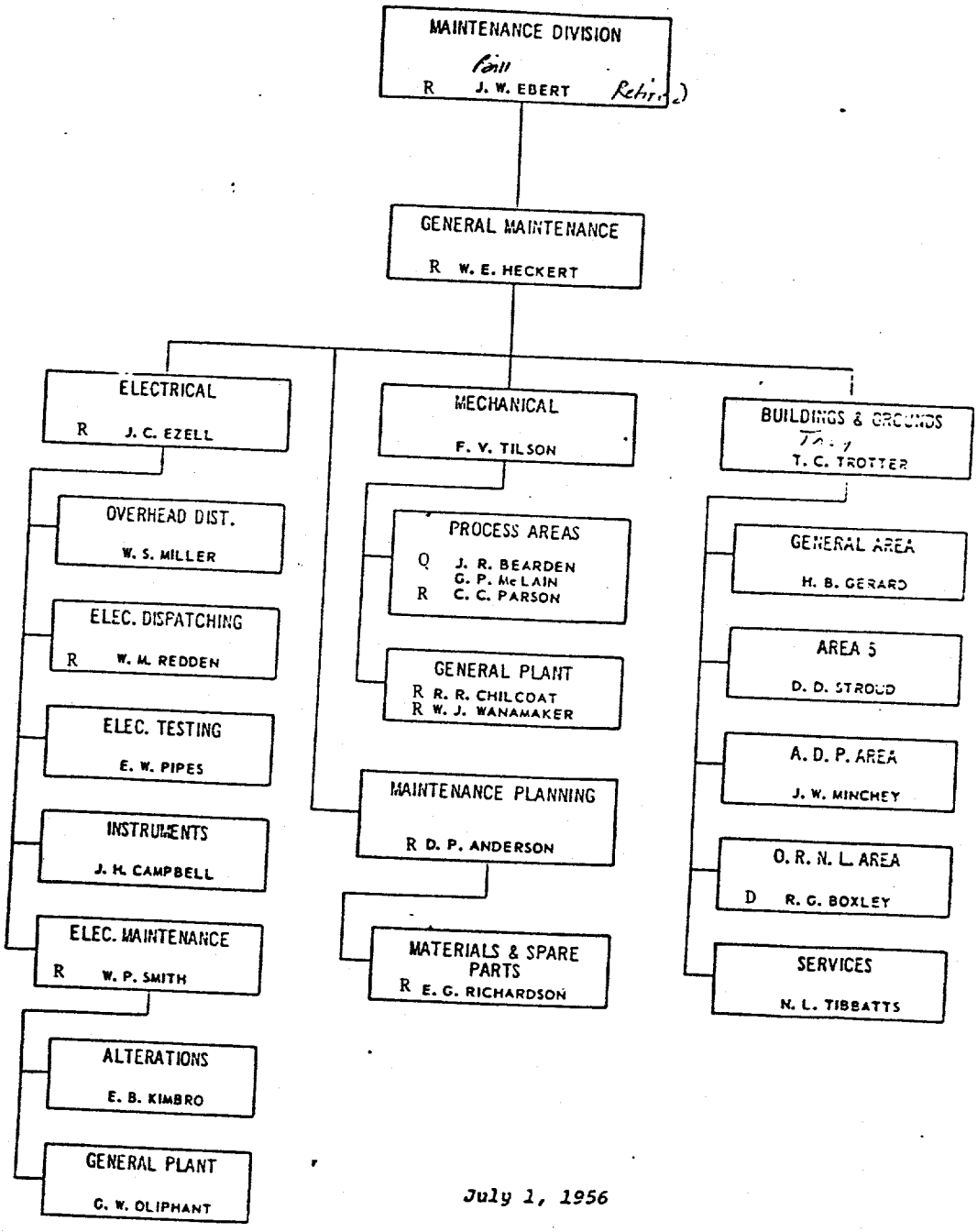
* Dual Capacity

July 1, 1956

Mercury Task Force S-1335 HLVM 7-12-83
Organization Chart - Maint. Div.
7-1-56

D - Deceased
Q - Quit
R - Retired

Y-12 ORGANIZATION CHART
MAINTENANCE DIVISION



July 1, 1956

(1) Shortages of as much as 2% due to baking flasks was estimated by AEC personnel present the mercury was being dumped from the flasks.

(2) Any iron present is considered in footnote (3) below.

(3) Analyses varied between 8 PPM and 16 PPM in 115,000,000 of Li OH tails. An average of 12 PPM of mercury in the tails was used for the report.

(4) Unconfirmed reports of as much as 54,000 pounds of mercury recovered from a 5 scrap cannot be verified. A minimum of 14,000 pounds is considered to be a conservative estimate.

(5) A Mallory Battery Company employee stated that all records of mercury recovery had been destroyed but he thought that 174,000 pounds or more, possibly as much as 200,000 pounds of mercury was recovered.

(6) Flashing average taking the ultraconservative position that the standard deviation is 10 oz. rather than 1 oz., as is suggested by the data, a 99+% confidence interval becomes ±984 pounds. (P. 50)

(7) Alpha 4 equipment still in place could have as much as 225,000 pounds of mercury, per estimates.

(8) Alpha 4 sludge was estimated to contain as much as 275,000 pounds of mercury.

(9) ORNL reported 800 pounds of mercury was recovered from a sewer pipe. We suspect that the reported amount was not actually 800 pounds but was rounded to the nearest even number or 800 pounds.

4.7.2 Discussion of Errors

Mercury charged to Y-12 vs mercury actually received presents the greatest uncertainty in Y-12 accountability for mercury. Mercury was vouchered to Y-12 on the basis that all flasks contained 76 pounds. Many are known to have had pin holes and leaks. Some reportedly were empty.

Mercury Task Force — HVM 6-2-83
Correspondence - Excerpts from letter - Armstrong to Sapirie
5-25-1954
Source: DOE audit work Papers

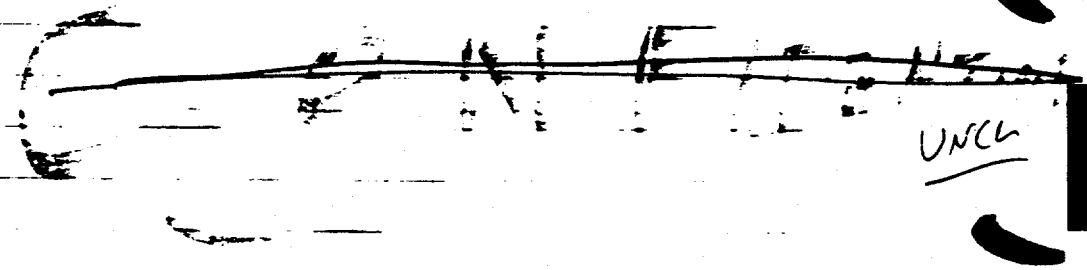
~~CONFIDENTIAL~~

May 25, 1954

Armstrong to Sapirie

Solvent Receipts & Costs

Date of Delivery	Quantity	Unit cost
June '52 - Sept. '52	479,064	2.50
Dec. '52 - Feb. '53	1,457,067.5	2.23
Dec. '53	479,287.5	2.51
Jan. '54	760,283	2.39



UNCL

3370-5-75
4300-5-

Kyle Hodgsburg 46613

Initials Date
Prepared by RVM
Approved by

Mercury Task Force
Memo Re: Recovery of Hg
8-4-1958
Source: Plant Records Q3-2 Colex Losses

Q3-2
Colex Losses
not copied

INTER-COMPANY CORRESPONDENCE

UNION CARBIDE NUCLEAR COMPANY
Division of Union Carbide Corporation

To: Mr. R. A. Walker

Plant: Y-12

Date: August 4, 1958

Copies To: J. S. Reece (NOY-12E-C)

Subject: Comments on Mr. Kite's Memo "A Preliminary Study of the Recovery of Lithium and Mercury Losses" of May 19, 1958

Average monthly losses for two different periods of Colex Operations are:

	Case 1	Case 2
	February through April	May through July
Alloy	50,200 lbs. $LiOH.H_2O$	20,225 lbs. $LiOH.H_2O$
Mercury	7,348 lbs. $LiOH.H_2O$	3,624 lbs. Hg.

The time required to amortize an installation to recover alloy and mercury in Case 1 is 1.2 years, whereas in Case 2, 8 years are required. Economics do not indicate that any recovery installation is justified.

It is believed that with continued effort a further reduction in the lithium losses would be made. It needs to be kept in mind, however, that the adjustment of acidity being received in the creek will require the addition of an alkali other than $LiOH.H_2O$. Should the amounts be further reduced, the question of the economics of this situation would appear to favor the deliberate addition of a cheaper alkali. The reduction of mercury losses can be further accomplished if water washing can be successfully substituted for acid washing. The writer believes that a system of purification for mercury using oxidation and filtration would reduce losses and improve quality.

At this time, the level of lithium concentration in the creek is within the limits prescribed by law. In the case of mercury, no state law exists as to the limit of contamination in creek waters. However; according to literature indicates that their wastes are held to a maximum value of .05 ppm mercury.

Several suggestions are in order concerning the recovery of mercury which is even now being discarded. The present arrangement of using the trap

tanks in Alpha-4 should assist in reducing the level of mercury going to the sump and thence to the creek, and it is recommended all installations of this kind be handled by allowing the tanks to act as traps with periodic withdrawal of the sludge and raw mercury for recovery. Consideration should also be given to filtration of the effluents from the trap tanks enroute to the sump.

Another variation which could be considered would be that of installing a dam across the creek below the point of entry of the Alpha-4 wastes, forming a settling pond and sand filter combined. The purpose of such an installation would be to even out the flow so as to assist in a more uniform neutralization of acid wastes and to reduce the amount of mercury being discharged into the creek. Proper construction of such a filter and settling basin would permit removal of the sand periodically for recovery of the mercury, although for recovery purposes it would appear that the installation of the filters between the trap tanks and the sumps would be the more desirable. It cannot be too strongly emphasized that continuing efforts to reduce losses should be made.

John S. Reece

John S. Reece

JSR/bg

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Document has been previously released ☑ No ☐ Yes (Reference)

DIVISION REVIEW AND APPROVAL (Completed By Requesting Division)

TECHNICAL CLASSIFICATION REVIEW (Divisional Classification Representative)

Title(s): U Abstract: N.A.

DOCUMENT: Level U Category N.A

H.D. Harkness — Signature — 8-7-95 Date

DOCUMENT REQUEST APPROVED (Division or Department)

S.W. Wiley — Signature — 8/4/95 Date

Signature — Date

THE REMAINDER OF THIS FORM TO BE COMPLETED BY THE TECHNICAL INFORMATION OFFICE

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APPROVAL AND RELEASE

Date Received	Date Initiated
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☐ Editor — Date

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☐ — Date

☐ — Date

☒ CLASSIFICATIONS:

Title(s): U Abstract NA

DOCUMENT:

Level U Category —

Weapons Data — Sigma —

J.R. Rowan — Y-12 Classification Office — 8-8-95 Date

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P.K. McKenney — Technical Information Office — 8/8/95 Date

Conditions/Remarks:

Hg Inventory Data

6-28-74 Letter (Y/HG-24)

114

51

+69

234,000 × 76 = 17,784,000

329,000 × 76 = 25,004,000

$3.09/lb

329,000
- 234,000
95,000

31,000 × 76 = 2,356,000
- 890 (20,000) lbs.

51,000 × 76 = 3,876,000 ?

9-22-78

$1.95/lb

cy. Pluhar
Smith
Williams
JMC, 7-2-74

M-324

UNCLASSIFIED

June 28, 1974

Y/HG-0264

D. K. Geston, Chief, Uranium Enrichment Branch, DP&M, HQ

MERCURY PURCHASES AND SALES

Attached is a history of ORO mercury transactions which was prepared in response to your memorandum of May 29, 1974.

Some general discussion of the mercury program at the Y-12 Plant may help put the attached in perspective. All the mercury was procured for use in developing and/or operating lithium isotope separation facilities. A total of around 25 million pounds was received in very large orders. Records pertaining to the initial procurements in support of the development efforts are not conveniently available and the approximate total is shown as 1953 acquisition: the cost of this material is not known. The 24 million pounds purchased for production cost $235/flask, or $75 million total. Most of the transfers or excess declarations resulted in no dollar return to the AEC; however, 20,000 flasks were sold by GSA for the AEC in 1965 and 1966 resulting in $9 million revenue.

#309/16.

not in regos.

Hickman 1974

We hope the attached information will be useful to the GSA. With the exception of around 3,000 flasks transferred to Other-AEC, all the OFA transfers were made with the knowledge of GSA and their records should be available if they require more information.

If you need further information, we will attempt to answer specific questions. For your information, our present inventory is about 7 million pounds. (95,000 flasks).

ORIGINAL SIGNED BY
M. R. Theisen

H. D. Hickman
Director
Manufacturing Divis

OM:MRT

BC: J. H. Hill
T. H. Hardin
W. H. Henderson
J. M. Case, w/Encl.

HISTORY OF OAK RIDGE MERCURY ACTIVITIES

Thousands of Flasks (76 Lbs. Each)

	Acquired (1)	Consumed Nat. S/P (2)	Consumed AEC/OFA (3)	Consumed (4)
1950				
1951				
1952				
1953	836,000 lb. = 11			
1954	1,520,000 = 20			**
1955	12,616,000 = 166			**
1956	10,032,000 = 132			**
1957		14		**
1958				**
1959				**
1960				**
1961				**
1962				**
1963			3	**
1964		41	5	**
1965		14	63	**
1966			6	
1967			20	
1968			1	
1969				
1970			15	
1971				
1972				
1973			1	
Totals	25,004,000 lb. = 329	69	114	51 = 3,876,000 lb.

17,784,000 lb.

(1) The 1954, 1955, and 1956 acquisitions are accurate and cost an average of $235/flask. The quantity shown for 1953 represents an estimate of that previously procured in numerous small actions.

(2) This reflects physical transfer back to the DMS national mercury stockpile.

(3) This column reflects a generally accurate estimate of all other off-site transfers to other agencies, other AEC sites, and sales. The OFA transfers were made under a variety of excess disposal procedures - GSA sales, straight excess transfers, donations to states, and excess declarations to GSA with ORO/UCC-ND acting as GSA's handling and shipping agent. The time phasing is approximate. An approximate break down of these is as follows:

Transfers within AEC and OFA	16
Donated thru DHEW	10
Sold by GSA for AEC	20
Transferred to GSA for Sale	68
Total	114

(4) Total of 51K flasks consumed in operation. This is an approximation of the time frame of the consumption without an effort to quantify it by year.

[redacted]

cy: Pluhar
Smith
Williams
JMC, 7-2-74

M-329.

UNCLASSIFIED

June 28, 1974

Y/HG-0264

D. K. Geston, Chief, Uranium Enrichment Branch, DPMH, HQ

MERCURY PURCHASES AND SALES

Attached is a history of ORO mercury transactions which was prepared in response to your memorandum of May 29, 1974.

Some general discussion of the mercury program at the Y-12 Plant may help put the attached in perspective. All the mercury was procured for use in developing and/or operating lithium isotope separation facilities. A total of around 25 million pounds was received in very large orders. Records pertaining to the initial procurements in support of the development efforts are not conveniently available and the approximate total is shown as 1953 acquisition; the cost of this material is not known. The 24 million pounds purchased for production cost $235/flask, or $75 million total. Most of the transfers or excess declarations resulted in no dollar return to the AEC; however, 20,000 flasks were sold by GSA for the AEC in 1965 and 1966 resulting in $9 million revenue.

#309/lb.

We hope the attached information will be useful to the GSA. With the exception of around 3,000 flasks transferred to Other-AEC, all the OFA transfers were made with the knowledge of GSA and their records should be available if they require more information.

If you need further information, we will attempt to answer specific questions. For your information, our present inventory is about 7 million pounds. (95,000 flasks).

ORIGINAL SIGNED BY
M. R. Thelsen

H. D. Hickman
Director
Manufacturing Divis

OMW:MRT

BC: J. H. Hill
T. H. Hardin
W. H. Henderson
J. M. Case, w/Encl.

UNCLASSIFIED

HISTORY OF OAK RIDGE MERCURY ACTIVITIES

Thousands of Flasks (76 Lbs. Each)

	Acquired (1)	Consumed Nat. S/P (2)	Consumed AEC/OFA (3)	Consumed (4)
1950				
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1953	836,000 lb. = 11			
1954	1,520,000 = 20			**
1955	12,616,000 = 166			**
1956	10,032,000 = 132			**
1957		14		**
1958				**
1959				**
1960				**
1961				**
1962				**
1963			3	**
1964		.41	5	**
1965		14	63	**
1966			6	
1967			20	
1968			1	
1969				
1970			15	
1971				
1972				
1973			1	
Totals	25,004,000 lb. = 329	69	114	51 = 3,876,000 lb.

17,784,000 lb.

(1) The 1954, 1955, and 1956 acquisitions are accurate and cost an average of $235/flask. The quantity shown for 1953 represents an estimate of that previously procured in numerous small actions.

(2) This reflects physical transfer back to the DMS national mercury stockpile.

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Transferred to GSA for Sale	68
Total	114

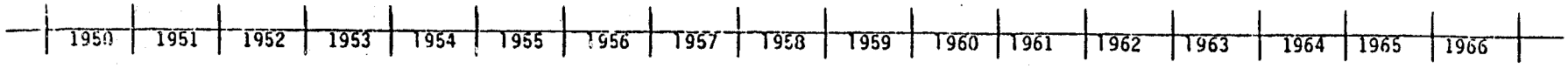
(4) Total of 51K flasks consumed in operation. This is an approximation of the time frame of the consumption without an effort to quantify it by year.

[redacted]

M-144

Y-12 Activities Related to Mercury

1950-1966



1950
--Elex development-9733-2

1951-52
--Orex development 9733-1
9202

1951-55
--Elex and Colex pilot plants - 9201-2
~109,000# loss. vs. 95000 (YEX24)

1953-55
--Orex pilot plant 9202
~50,000# loss.

1953-56
-- Elex production-9204-4

1955-59
1963 (6 mo)
--Colex production-9201-5.

1955-62
--Colex production-9201-4

1955-56
--Hg spills in 9201-4 and 9201-5. Losses unknown.

1956-62
--Hg Recycle/Recovery-81-10
3,600,000# reclaimed.

1956
--Massive cleanup of 9201-4 and 9201-5 production facilities while in operation - ~$2000 K.

1957-1958
--Stripped & decontaminated 9202, 9201-2, and 9204-4.

1958-June
--Colex production: discontinued washing Hg with HNO_3

"improved" 1958
"discontinued" 1963
(YEX24)

1963-64
--Built New Hope Pond

1965-66
--9201-5 Hg drained; facility stripped; building decontaminated.

--9201-5 Spilled 100,000# Hg; about 50% recovered. ~~50,000#~~ lost

--9720-26 constructed to store Hg.

--9201-4 Placed in standby; Hg into large vessels; $100 K per yr to assure no Hg losses.

H. H. Stoner
6-9-83

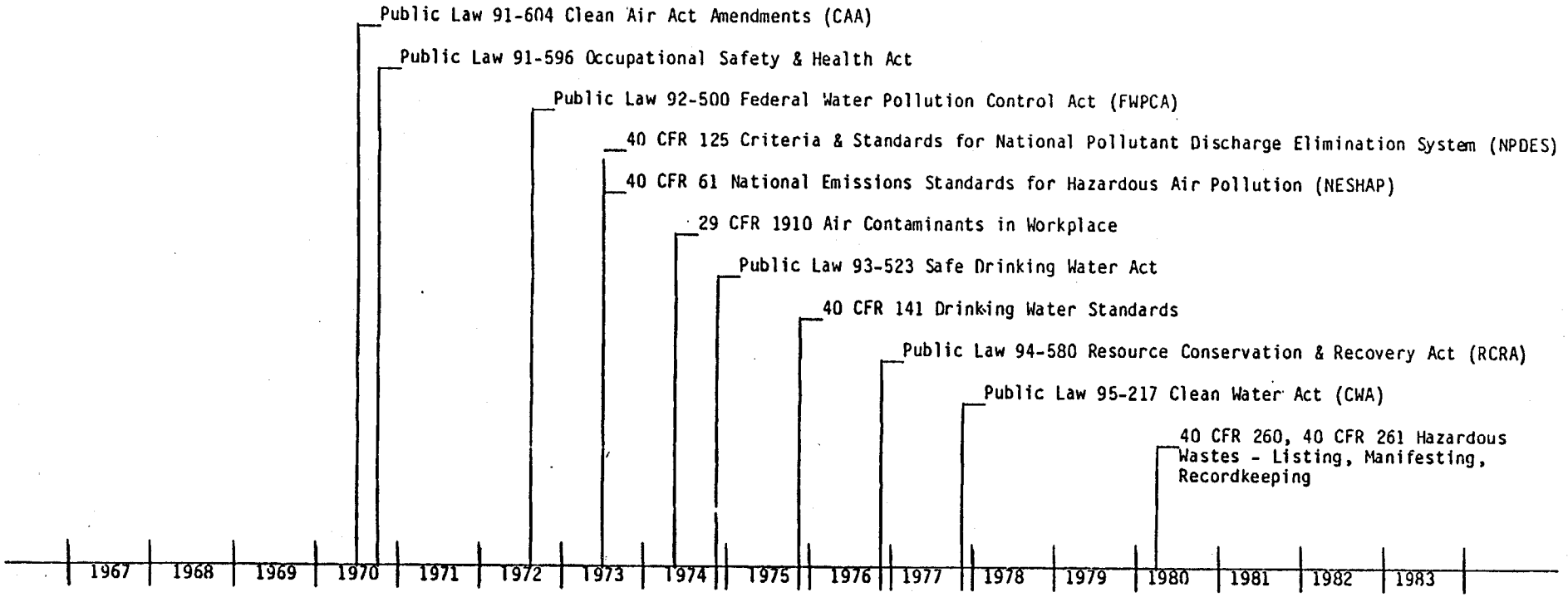
not in repos.

Stoner 1983

from Y/HS-0071

Y-12 Activities Related to Mercury

196. 83



1972--73
--NHP dredged and sludge basin built.

1977
--Study of Hg in waters draining Y-12.

--Drained and stored Hg from 9201-4.

--Hg material balance study prepared.

Case?

1982
--Study of Hg in waters draining Y-12.

--Search for drain lines which might be active source of Hg.

1983
--Effort to decrease Hg from Y-12
  a) sediment dams in industrial ditch

  b) cleanup in buildings 81-10, 9201-4, and 9201-5.

H. H. Stoner
6-9-83

Y/HG-0071

M-44

UNITED STATES
ATOMIC ENERGY COMMISSION
Oak Ridge, Tennessee

In Reply
Refer To: AU:FPT

M-445

UNCLASSIFIED

ORO 79220

Classification changed to UNCLASSIFIED (Insert appropriate classification (Secret or Confidential) and category)
by authority of 1134-858 8-30-94 (Authority for change in classification) (Date)
By Audrey Windham 9-14-94 (Signature of person making change) (Date)
Verified by P.C. Stam 9-15-94 (Signature of person verifying change) (Date)

Union Carbide Nuclear Company
Post Office Box P
Oak Ridge, Tennessee

Attention: Mr. J. P. Murray, Y-12 Plant Superintendent

Gentlemen: Mercury Shipment ORO 79220 (Y/HG-0541)

The General Manager has authorized the transfer of 100,000 pounds (1316 flasks) of mercury to the ANP Project at Arco, Idaho. The Office of Classification advises that the association of mercury with the ANP Program is "Secret - Restricted Data."

It is requested that you arrange for the rail shipment of this quantity of mercury from that received from GSA and currently on hand in its original containers. The material should be shipped by Government bill of lading which will be furnished you by our Traffic Section. When the material is loaded, will you kindly notify this Section and they will deliver to you the necessary Government bill of lading. The material is to be shipped as chemicals NOIBN in sealed freight car to Phillips Petroleum Company, NRTS, Scoville, Idaho, with the Union Pacific Railroad as the delivering carrier.

Cost for the material is to be transferred to OROO at current book value for inventory through the current account for transfer by OROO to the Chicago Operations Office. Please arrange to transmit the Form OR-598 to our Finance Division as soon as possible, but in any event no later than June 29, 1956.

It is important that the shipment be effected as soon as possible in order that the transaction can be reflected in the accounts by the close of this Fiscal Year. We would therefore appreciate your prompt attention in shipping the material as early as is practicable.

Very truly yours,

C. Armstrong
Director
Production Division

DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW
1st Reviewer: VRBurd (Name)
Authority: ○ ADC ● ADD
Date: 8/22/94
2nd Reviewer: mthurs (Name)
Authority: ● ADD
Date: 8/30/94
Determination 2, 4 [Insert Number(s)]
1. Classification Retained
2. Classification Changed To: U
3. Contains No DOE Classified Information
4. Classification Cancelled
5. Classified Information Bracketed
6. Other (Specify):

MMES QA
Y-12 Classification Office
Name: JSmurrell
Date: 12-14-94

JUN 21 1956
Y-12
SUPERINTENDENT

APPROVED FOR PUBLIC RELEASE
Technical Information Office Date

CC: N. H. Woodruff
C. E. Center, UCNC
L. B. Emlet, UCNC

UNCLASSIFIED
SECRET

This document consists of 1 pages. No. 1 of 9 copies. Series A

SECRET

SECURITY INFORMATION

3/4/52

KA-254

Re Ta-4

CARBIDE AND CARBON CHEMICALS DIVISION

RBON CORPORATION

M-602

E BOX P

:, TENN.

April 25, 1952

APPROVED FOR PUBLIC RELEASE

1952

Technical Information Office Date

11/8/94

KA 254 B 7A

DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW

1st Reviewer: (Name)

Authority: ADC ADD

Date: 8-19-94

2nd Reviewer: (Name)

Authority: ADD

Date: 8/25/94

Determination 4, 2 [Insert Number(s)]

1. Classification Retained
2. Classification Changed To: U
3. Contains No DOE Classified Information
4. Classification Cancelled
5. Classified Information Bracketed
6. Other (Specify):

United States Atomic Energy Commission
Post Office Box E
Oak Ridge, Tennessee

Subject: Mercury for Alloy Development Plant

(Y/HG-0511)

Attention: Mr. S. R. Sapiro

Gentlemen:

Reference is made to our letter of December 11, 1951, which gave the estimated requirement of 900,000 pounds of prime virgin mercury for the Alloy Development Plant, and to the Feasibility Report, Y-C3.4, dated January 9, 1952, which gave 1,000,000 pounds as the estimated requirement. It is our understanding that the mercury will be obtained from the General Services Administration and that we should furnish, at this time, any revision of previous estimates.

It is impossible to arrive at an exact figure because of the unknown hydraulics of the system. This can be evaluated much more effectively after operating experience is obtained with the Component Testing Facility. We suggest that arrangements be made with the General Services Administration whereby 1,000,000 pounds is firmly committed, with the provision that an additional 200,000 pounds be available if required. Firm information will then be supplied as well in advance of the shipping date as possible.

It is desired that approximately 50,000 pounds be received by July 1, 1952, with the remainder to be delivered prior to January 1, 1953.

Yours very truly,

CARBIDE AND CARBON CHEMICALS COMPANY

Clark E Center

General Superintendent

MMES QA
Y-12 Classification Office
Name: AS Murrill
Date: 10-31-94

C. E. Center
GAS:rpm
Distribution:
Copies 1 - 2: Mr. S. R. Sapiro
3: Mr. W. B. Emens
4: Mr. W. D. Lavers
5: Dr. J. W. Strohecker
6: Mr. G. M. Clewett
7: Mr. J. M. Burden
8: Mr. G. A. Sturgeon
9: Mr. C. E. Center

Classification changed to Unclassified
(Insert appropriate classification level and category)

by authority of YKA-858 8-29-94
(Authority for change in classification) (Date)

by Audrey Windham 8-31-94
(Signature of person making change) (Date)

Verified by R J Graser 8-31-94
(Signature of person verifying change) (Date)

SECRET

SECURITY INFORMATION

CARBIDE AND CARBON CHEMICALS COMPANY
A DIVISION OF UNION CARBIDE AND CARBON CORPORATION
UCC
POST OFFICE BOX P
OAK RIDGE, TENN.

Beta-4

M-602

September 8, 1952

United States Atomic Energy Commission
Post Office Box E
Oak Ridge, Tennessee

Subject: Mercury for Alloy Development Plant

Attention: Mr. S. H. Shirin (Y/HG-0512)

Gentlemen:

Reference is made to our letter of April 25, 1952, which gave the estimated requirement of 1,000,000 pounds of prime virgin mercury for the Alloy Development Plant. This letter also requested that an additional 200,000 pounds be available if required.

Our latest development work now indicates that a total of 1,400,000 pounds of prime virgin mercury will be required. This increased requirement is based on:

(a) Probability of increased flow rates in the plant and therefore greater depths in the trays.
(b) Increased development activity will require quantities greater than anticipated.
(c) Mercury losses may be in excess of those originally calculated.

We suggest that arrangements be made with the General Services Administration whereby 400,000 pounds, in addition to the scheduled 1,000,000 pounds, be firmly committed with delivery to be completed prior to January 1, 1953.

Yours very truly,

CARBIDE AND CARBON CHEMICALS COMPANY

General Superintendent

C. E. Center
WKW:jm
Distribution:
Copies 1 - 4: Mr. S. H. Shirin
5: [illegible]
6: Dr. E. Miller
Dr. J. W. Strohecker
[illegible] Clausett
7: Mr. W. H. Herndon
8: Mr. O. A. Strasser
9: Mr. W. K. Whitson, Jr.
10: Mr. C. E. Center

UNCLASSIFIED

SECRET
SECURITY INFORMATION

OAK RIDGE NATIONAL LABORATORY
OPERATED BY
CARBIDE AND CARBON CHEMICALS COMPANY
A DIVISION OF UNION CARBIDE AND CARBON CORPORATION

UCC

POST OFFICE BOX P
OAK RIDGE, TENN.

Beta - 4

MMES QA
Y-12 Classification Office
Name: K Murrill
Date: 10-31-94

KA 286 9 10A

October 10, 1952

United States Atomic Energy Commission
Post Office Box E
Oak Ridge, Tennessee

(Y/HG-0513)

Attention: Mr. S. R. Sapirie

Subject: MERCURY FOR OREX ADP PROCESS DEVELOPMENT

Gentlemen:

Reference is made to our letter of September 8, 1952, which fixed our Elex ADP requirements at 1,400,000 pounds of prime virgin mercury.

It is now possible for us to make a fairly accurate estimate of 150,000 pounds as our fiscal year 1953 mercury requirements for Orex ADP process development. We propose to withdraw that amount from the supply now on hand for Elex ADP and suggest that arrangements be made with the General Services Administration for a commitment for this amount with delivery to be completed prior to February 1, 1953, for replacement in the Elex stockpile of that amount removed for Orex ADP development.

Very truly yours,

CARBIDE AND CARBON CHEMICALS COMPANY

General Superintendent

APPROVED FOR PUBLIC RELEASE
Technical Information Office Date 11/8/94

DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW

1st Reviewer: R Rowan (Name)
Authority: ADC ADD
Date: 8-16-94
2nd Reviewer: R Baylor Jr (Name)
Authority: ADD
Date: 8/25/94

Determination 4, 2 [Insert Number(s)]
1. Classification Retained
2. Classification Changed To: U
3. Contains No DOE Classified Information
4. Classification Cancelled
5. Classified Information Bracketed
6. Other (Specify):

Distribution:
Copy 1-2. Mr. S. R. Sapirie
3. Dr. C. E. Larson
4. Mr. W. B. Humes
5. Mr. L. B. Emlet
6. Mr. G. H. Clewett
7. Dr. F. L. Steahly
8. Mr. J. M. Herndon
9. Mr. W. K. Whitson
10. Mr. C. E. Center

Classification changed to Unclassified
(Insert appropriate classification level and category)
by authority of YISA-858 8-29-94
(Authority for change in classification) (Date)
by Audrey Windham 8-30-94
(Signature of person making change) (Date)
Verified by R H Fraser 8-31-94
(Signature of person verifying change) (Date)

SECRET
SECURITY INFORMATION

UNCLASSIFIED

UNCLASSIFIED

Classification changed to
Unclassified
(Insert appropriate classification level and category)

by authority of VISA-858 8-29-94
(Authority for change in classification) (Date)

by Audrey Windham 8-30-94
(Signature of person making change) (Date)

Verified by RJ Fraser 8-31-94
(Signature of person verifying change) (Date)

~~SECRET~~ This Document contains 2 Pages.
~~SECURITY INFORMATION~~ This is copy 5 of 10 Series A

CARBIDE AND CARBON CHEMICALS COMPANY
A DIVISION OF UNION CARBIDE AND CARBON CORPORATION

POST OFFICE BOX P
OAK RIDGE, TENN.

M-602 KA-309

APPROVED FOR PUBLIC RELEASE
[signature] 11/8/94
Technical Information Office Date

March 18, 1953

KA 309 8 10A

United States Atomic Energy Commission
Post Office Box E
Oak Ridge, Tennessee

Subject: Mercury for Alloy Development Plant (U)

Attention: Mr. S. R. Sapirie

(Y/HG-0514)

Gentlemen:

It is now possible, because of operating experience in the Component Testing Facility, to make a more accurate estimate of mercury requirements for Elex ADP. We are also in a better position to estimate Orex ADP requirements more accurately than estimates given in our letter of October 10, 1952. The estimates tabulated below include both development and production activities.

	Operating Inventory Necessary for Start-Up	Yearly Rate of Mercury Usage
Elex	1,400,000 lbs.	150,000 lbs.
Orex	290,000 lbs.	29,000 lbs.
Total	1,690,000 lbs.	179,000 lbs.

MMES QA
Y-12 Classification Office
Name: JS Murrill
Date: 11-1-94

Since deliveries of prime, virgin mercury to date have totalled 1,436,932 pounds, it is requested that arrangements be made with the General Services Administration for the following firm commitments:

1. Delivery prior to June 1, 1953 (or before plant start-up) 300,000 lbs.

2. Delivery of the make-up at the rate of 44,750 lbs/quarter, starting in July 1953.

We will periodically re-evaluate the yearly usage requirement as plant operations proceed, and will promptly inform you if the requirement changes.

DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW

1st Reviewer: [signature] (Name)	Determination 4 2 [Insert Number(s)]
Authority: ADC ADD	1. Classification Retained
Date: 8-19-94	2. Classification Changed To: U
2nd Reviewer: R Baylor Jr (Name)	3. Contains No DOE Classified Information
Authority: ADD	4. Classification Cancelled
Date: 8/25/94	5. Classified Information Bracketed
	6. Other (Specify):

Very truly yours,

CARBIDE AND CARBON CHEMICALS COMPANY

[signature]

C. E. Center
Vice President

LBB:rmp

not in files
Center 1953

UNCLASSIFIED

M-602

February 12, 1953

M-602 Component Test Facility

SOLVENT - C.T.F. AND BETA-4

Y/HG-0490/1

I. Amount of Solvent in C.T.F. line 1 by Inventory:

Line #1 in the C.T.F. pilot plant had a maximum of 7416 pounds of solvent in it on February 4, 1953. Any solvent loss that occurred since the startup is included in this figure. It is estimated that 477 pounds of solvent have been lost as oxide, thereby reducing the amount of solvent in line #1 to 6939 pounds.

The above figures were determined by inventory.

1.	Amount of solvent bought	22,800 pounds
2.	Less weight of solvent outside trays	9,381.5 pounds
		13,418.5
3.	Less amount of solvent in line #2	5,835.0
		7,583.5
4.	Less amount transferred out	59.5
		7,524.0
5.	Less amount in verticle stripper	108.0
		7,416.0 →

Item #2 can be broken down as follows:

(a)	Weight of solvent in dollies	3,231 pounds
(b)	Weight of solvent in flask	1,102 pounds
(c)	Solvent in lines to and from sump	3,226 pounds
(d)	Solvent in sump (7" outage)	1,822.5 pounds
		9,381.5

Item #3 was obtained from original startup data. At that time, the amount of solvent (weight) required to fill line #2 to the overflow point was obtained. Line #2 at the inventory time on February 4, was under identical conditions to those at the original startup.

Item #4 included solvent removed from the system as zincate and for special run experiments.

Item #5 was calculated as being the amount held up by the verticle stripper.

II. Solvent in C.T.F. line #1 by inventory:

Assuming that 6,939 pounds of solvent is in the C.T.F. line #1, the calculated average level depth of the solvent in all the trays would be 1.47 inches. This would calculate to give a gradient of from 1.82 down to 1.12 in 20 ft. tray.

$$\frac{6{,}939 \text{ pounds}}{113.3} = 61.24 \text{ gal.}$$

$$\frac{61.24}{.004329} = 14{,}146 \text{ cubic inches because of solvent}$$

1,655 cubic inches because of liners and agitators

15,801 Total cubic inches

$$(3.75)(2868)(X) = 15{,}801$$

$$X = 1.47 \text{ inches}$$

3.75 = width

2868 = length

X = depth

III. Actual Depth of Solvent in C.T.F. by Measurement:

Actual depth measurements obtained at the ends of the bonnets indicate the average level depth to be 1.68 inches, and the total calculated weight of solvent in line #1 to be 7991 pounds. These figures are tabulated below:

Calculated Weight C.T.F. - On Average Level Depths

Tray	Pounds	Average Level Depth	High Point
1A1	546.1	1.387	2.0
1A2	722.8	1.79	2-11/16
1A3	744.4	1.84	2-9/16
1A4	704.0	1.75	2-6/16
1A5	678.7	1.69	2-9/16
1R1	615.2	1.547	2-6/16
1R2	685.4	1.706	3-3/16
1R3	662.0	1.653	3-3/16
1R4	687.2	1.71	3-6/16
1R5	630.4	1.581	3-2/16
1S1	715.4	1.67	2-5/16
1S2	#1 420.0	1.96	2-7/16
	#2 179.6	1.404	1-13/16
Total	7,991.2 pounds		

IV. Amount of solvent required in Beta-4 based on C.T.F. inventory and similar baffle configuration.

Since 7,416 pounds of solvent was necessary to fill and operate the C.T.F. for 27 days, it would take 900,902 pounds to fill and operate the trays at Beta-4 for

27 days. In addition to this amount 191,477 pounds would be required for the auxiliaries or a total of 1,092,379 pounds.

Total to fill and operate line #1 for 27 days	7,524
Less calculated amount in verticle stripper	108
	7,416

1.	60 verticle strippers at Beta-4	= 6,458	
2.	Regular trays and strippers Beta-4 (112.5)(7416)	= 834,300	
3.	Corner trays Beta-4 based on a level solvent depth 1.5 inches empty of agitators	= 60,144	
	Total	= 900,902	pounds
	Auxiliaries	= 191,477	pounds
		1,092,379	

Of the above amount, 477 pounds was removed in the C.T.F. as solvent oxide during the 27 day period. This amount in Beta-4 would correspond to 53,662 pounds.

$$(112.5)(477) = 53,662$$

V. Various calculated requirements of solvent for Beta-4 based on the following conditions and making allowances for the volume required by agitators and baffles.

(a) An average level depth of 2.25 inches per tray.
(This would compare to a depth of 3-1/4 inches in one end of a 20 ft. tray and 1-1/4 inches in the other end with a consistent gradient between the two points.)

1.	To fill auxiliaries	191,477
2.	To fill verticle strippers	6,458
3.	To fill horizontal strippers	107,952
4.	To fill normal trays	1,136,059
5.	To fill corner trays	83,908
	Total	1,525,854

(b) An average level depth of 1.50 inches per tray.

1.	To fill auxiliaries	191,477
2.	To fill verticle strippers	6,458
3.	To fill horizontal strippers	69,203
4.	To fill normal trays	728,859
5.	To fill corner trays	53,836
	Total	1,049,833

(c) An average level depth of 1.75 inches per tray.

1.	To fill auxiliaries	191,477
2.	To fill verticle strippers	6,458
3.	To fill horizontal strippers	82,119
4.	To fill normal trays	864,592
5.	To fill corner trays	63,860
	Total	1,208,506

(d) An average level depth of 2.0 inches per tray.

1.	To fill auxiliaries	191,477
2.	To fill verticle strippers	6,458
3.	To fill horizontal strippers	95,036
4.	To fill normal trays	1,000,326
5.	To fill corner trays	73,884
	Total	1,367,181

VI. Beta-4 Overflow Requirements in Case of Power Failure:

It is calculated that the trays at Beta-4 will hold 491,181 pounds of solvent with agitation off. This is based on a one inch level depth in all the trays.

The expected depth of the solvent in the C.T.F. line by inventory shows a 1.47 level depth. This compares to 782,695 pounds in Beta-4. A difference of these two amounts indicates that 291,514 pounds of solvent would flow out of Beta-4 if the agitation were stopped.

$$\frac{291,514}{113.3} = 2,573 \text{ gal.}$$

Present tanks and other storage for excess solvent will take care of approximately 2,000 gallons.

Previous calculations, believed to be very closely arrived at, indicates that the lines to and from the cascade solvent storage tanks will hold approximately 532 gallons. The storage and feed tanks will hold approximately 1,158 gallons during normal operation. The maximum amount that these tanks will hold is 3,000 gallons.

INTER-COMPANY CORRESPONDENCE

(INSERT NAME) COMPANY CARBIDE AND CARBON CHEMICALS COMPANY LOCATION Post Office Box P OAK RIDGE, TENN.

M-602

TO LOCATION W. K. Whitson, Jr (Y-12 RC)

DATE April 3, 1953

ANSWERING LETTER DATE

ATTENTION

COPY TO J. W. Ebert
L. P. Twichell
G. A. Strasser
M. J. Fortenberry
F. V. Tilson (File)

SUBJECT Solvent Tranfer to Colex

Y/HG-0490/2

Oret 9202

A total of 12,970 pounds of solvent was recovered from the Pilot Plant operations and is being transferred to Colex operations.

pilot plant 9201-2

F. V. Tilson

FVT:jm

APPROVED FOR PUBLIC RELEASE

Technical Information Office Date

UNITED STATES
ATOMIC ENERGY COMMISSION

M-602

Y/HG-530

ORO-33295

Y/HG-0536

UNCLASSIFIED

APPROVED FOR PUBLIC RELEASE
Ca K Lee 12/28/94
Technical Information Office Date

cc: L.B.Emlet (2)

NOTE: Please prepare reply.

June 18, 1953

W.B.Humes

Y12RC

MMES QA
Y-12 Classification Office
Name: AS Murrell
Date: 11-29-94

[redacted] and [redacted] Engineering Company
[redacted]
Oak Ridge, Tennessee

Oak Ridge, Tennessee
June 18, 1953

Attention: Mr. W. B. Humes, Superintendent of Production

Subject: FUTURE ADP SOLVENT REQUIREMENTS

Gentlemen:

Reference is made to your letter of March 18, 1953, subject, "Mercury for Alloy Development Plant."

Negotiations are now underway with the General Services Administration for the delivery of 479,000 pounds of mercury, requested in the above referenced letter. It is our understanding that about 150,000 pounds of mercury will be delivered to Oak Ridge about July 15, 1953, and the remaining 329,000 pounds will be delivered between August 1 - 15, 1953.

Since the availability of mercury in the national stock pile has become critical, the General Services Administration strongly urges that future ADP solvent requirements be requested six months to a year in advance of required delivery. Practically all of the mercury procured by the GSA is imported and its procurement has a definite effect on the world market. GSA also emphasized that if not all the anticipated solvent requirement is needed, the excess material can be easily be diverted to the national stock pile.

We will appreciate your again reviewing the ADP solvent requirements for FY 1954 and advising us as soon as possible of any anticipated additional solvent requirements.

Very truly yours,

[redacted]

S. R. Zapiria
Manager
Oak Ridge Operations

DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW

1st Reviewer: [redacted] (Name)
Authority: ADC ADD
Date: 8-19-94

2nd Reviewer: [redacted] (Name)
Authority: ADD
Date: 9/23/94

Determination 4, 2 [Insert Number(s)]
1. Classification Retained
2. Classification Changed To: U
3. Contains No DOE Classified Information
4. Classification Cancelled
5. Classified Information Bracketed
6. Other (Specify):

Classification changed to UNCLASSIFIED (Insert appropriate classification level and category)
by authority of Y/SA-8554 9-23-94 (Authority for change in classification) (Date)
by Andy L. Wickham 10-6-94 (Signature of person making change) (Date)
Verified by [redacted] 10-10-94 (Signature of person verifying change) (Date)

cc: Mr. C. E. [redacted]
Mr. H. H. [redacted]
Mr. F. P. Trent

UNCLASSIFIED

ORO 33295 3 11A

~~SECRET~~

~~SECURITY INFORMATION~~

Beta-4

UNCLASSIFIED

Classification changed to Unclassified
(Insert appropriate classification level and category)

by authority of VSA-858 9-6-94
(Authority for change in classification) (Date)

Audrey Windham 9-14-94
(Signature of person making change) (Date)

verified by R J Fraser 9-15-94
(Signature of person verifying change) (Date)

M-602

...ND CARBON CHEMICALS COMPANY
...N OF UNION CARBIDE AND CARBON CORPORATION

UCC

POST OFFICE BOX P
...OAK RIDGE, TENN.

File document consists of 1 pages.
No. 8 of 10 copies. Series A

July 14, 1953

KB-421

KB-421

U.S.Atomic Energy Commission
Post Office Box E
Oak Ridge, Tennessee

Attention: Mr.S.E.Sapirie, Manager, ORO (Y/HG-0534)

Gentlemen:

Subject: Future ADP Solvent Requirements ~~EE~~

Reference is made to your letter of June 15, 1953, ORO-33295, on future ADP solvent requirements. Mercury distribution is approximately as follows:

Sept. 1953 no's

Mercury on hand for Beta-4	1,254,000 lbs.	1,342,000	
Mercury on hand for Orex	104,000 lbs.		88
Total	1,358,000 lbs.	1,358,000 lbs.	69
			54
Mercury in Orex system 9202	45,000 lbs.	~~64,220~~ / 216,172	209
Mercury in CTF A-2	26,000 lbs.	116,356	
Mercury in Pilot Plant & Colex	36,000 lbs.		
Total	107,000 lbs.	107,000 lbs.	X
Mercury expected by Aug.15,1953 for Beta-4 and Orex	479,000 lbs. 3rd order	266,008 / 479,000 lbs.	213
		1,944,000 lbs.	

Mercury requirements for Fiscal Year 1954, as presently known, are adequately covered in the above tabulation with the possible exception of a 100% power increase to Beta-4. Completion of this expansion in late Fiscal Year 1954 or early Fiscal Year 1955 will require an additional 200,000 pounds of mercury for the increased flow rates.

Yours very truly,

CARBIDE AND CARBON CHEMICALS COMPANY

W B Humes

W. B. Humes
Superintendent of Production

MRH:mmh
dist.: Messrs.S.E.Sapirie,AEC (2)
C.E.Center
C.E.Larson (2)
L.B.Emlet
G.A.Strasser
W.K.Whitson,Jr.
M.J.Marron
File

APPROVED FOR PUBLIC RELEASE
Technical Information Office
Date 2/10/95

MMES QA
Y-12 Classification Office
Name: B Nunn
Date: 12-12-94

DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW

1st Reviewer: [signature]
(Name)
Authority: ADC ADD
Date: 8-19-97

2nd Reviewer: D. K. McConnell, Jr.
(Name)
Authority: ADD
Date: 9-6-94

Determination 1, 2 [Insert Number(s)]
1. Classification Retained
2. Classification Changed To: U
3. Contains No DOE Classified Information
4. Classification Cancelled
5. Classified Information Bracketed
6. Other (Specify):

UNCLASSIFIED

~~SECRET~~

M-602

SOLVENT INVENTORY

Y/HG-0341

	ABSORBER #1	ABSORBER #2	Reactors #1	Reactors #2	
6-2	2 5/16	1 12/16	2 9/16	1 13/16	5 liters
6-3	2 5/16	1 12/16	2 9/16	1 13/16	
6-4	2 4/16	1 14/16	2 8/16	1 14/16	
	2 5/16	1 14/16	2 9/16	1 13/16	→ 2 1/8 ↓ 1 7/8 / 1 14/16
6-12	1 15/16	1 10/16	2 5/16	1 12/16	10
6-13	2	1 9/16	2 7/16	1 12/16	3
	2	1 9.5	2 6/16	1 11/16	→ 1 11/16

1,294,000 × .1875

[redacted] not in regs Tilson 1953 [redacted]

Note: Supporting data for ADP mercury (requirements) request from Sapirie [ORO 33295 (See also M-602)] dated June 18, 1953; and response from Humes dated July 14, 1953 [KB-421 (See also M-602)].

RJ Jensen 6-19-94

Mercury Received 1934 ?12

Orex 4-12 64,220
" 4-10 151952
216,172 ✓

216172 Orex
116356 Colex
1248800 Elex
1580528
360008
1,940536

Colex, CTF of 116556 ✓

Beta 4 in Process 1,248,800
94 ✓

Stored in Beta 4 94000 ✓
in 4-12 Store 266008 ~4000 flasks
360,008

7-20-53

Re: Recd Plant

1. Solvent Dumped To Date: 1,246,704 Lbs (16,404 Bottles)

2. Solvent Bottles In 9204-4: 1252 (95,152 Lbs)

3. Solvent Bottles In Stores: 1672
Tot 2924 (222,224 Lbs)

Solvent Tubs Received by Shaw
Solvent Line X 10

4. Solvent In Trays & Headers Not Flowing: 815,898 Lbs.

5. Calculated: 9-15-53
Over Flow 281,869
{N. Plant @ 3.0 l/m/line
S. Plant @ 3.5 l/m/line
9204-4

6. Calculated Overflow 9-27-53:
290,764
{N. Plant @ 3.5 l/min/line
S. Plant @ 3.5 l/min/line

7. Amt Necessary To Increase Flow In N. Plant From 3.0 to 3.5 l/min/line:
8,895 lbs.

8. Calculated Maximum Tray Over Flow Based on Initial operations of South Plant When Tray Levels Were Highest:
356,998 Lbs

9. Amt. Necessary To Increase Flows From 3.5 l to 6.0 l Based on Step 7: 88,950 lbs

10. Amt. Necessary To Increase Flows From 3.5 l to Max Flow Based on Step 8: 66,234 lbs

F. L. Wilson

Solvent
Inventory

Receipts -	1st order	1,040,136			
	2nd order	415,824			
	3rd order	478,952			
	Total	1,934,912			
			usage	over Y-12	64,220
				over X-10	151,952
				Other Y-12	116,356
				Beta 4	1,336,376
				Total	1,668,904
				Inventory	266,008

~~UNCLASSIFIED~~

M-195

INTER-COMPANY CORRESPONDENCE

(INSERT NAME) COMPANY CARBIDE AND CARBON CHEMICALS COMPANY LOCATION Post Office Box Y OAK RIDGE, TENN.

TO Mr. W. K. Whitson, Jr.
LOCATION Building 9723-19

DATE September 1, 1954

ANSWERING LETTER DATE

ATTENTION
COPY TO Mr. D. W. Harrigan
Mr. Corum Scott

SUBJECT Feed Salt and Solvent Status

Y/HG-0455

RESTRICTED DATA | CONFIDENTIAL

This document contains [illegible] information affecting the National Defense of the United States within the meaning of the Espionage Laws, Title 18, U.S.C., Sections 793 and 794. Its transmission or the revelation of its contents in any manner to an unauthorized person is prohibited by law.

In compliance with your request we are submitting inventory of Feed Salt "A", Feed Salt "X" and Solvent as of August 31, 1954.

Feed Salt "A"	1,811,375 lbs.
Feed Salt "X"	18,000 lbs.
Solvent (Stored in yard, Gov't owned)	1,092,196 lbs.
Solvent (Stored in Bldg. 9771, charged to Account 2900-525)	33,136 lbs.

Note: Solvent stored in Building 9402-4 not included.

APPROVED FOR PUBLIC RELEASE
Technical Information Office Date 1/5/95

MMES QA
Y-12 Classification Office
Name: [illegible]
Date: 12-21-94

JW Garland
Stores Department

JWGarland:pba
Y-12RC

DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW

1st Reviewer: [illegible] (Name)
Authority: ADC ADD
Date: 9-1-94
2nd Reviewer: R Bayless Jr (Name)
Authority: ADD
Date: 9/6/94

Determination 4, 2 [Insert Number(s)]
1. Classification Retained
2. Classification Changed To: U
3. Contains No DOE Classified Information
4. Classification Cancelled
5. Classified Information Bracketed
6. Other (Specify):

~~CONFIDENTIAL~~

Classification changed to Unclassified
(Insert appropriate classification level and category)

by authority of YLSA-858 9-6-94
(Authority for change in classification) (Date)

by Audrey Windham 9-12-94
(Signature of person making change) (Date)

Verified by R J Fraser 9-14-94
(Signature of person verifying change) (Date)

pls. 9-V-54
Distr. 9/7
gpb.

THIS FORM FOR INTER-COMP[illegible]

WCX-80 (6-54)

INTER-COMPANY CORRESPONDENCE

(INSERT NAME) COMPANY CARBIDE AND CARBON CHEMICALS COMPANY LOCATION Post Office Box P OAK RIDGE, TENN.

Y/HG-0453

TO LOCATION R. J. Barron ← M-195

DATE October 28, 1953

ANSWERING LETTER DATE

ATTENTION COPY TO J. E. Smyrl (file)

SUBJECT Building 9204-4 Solvent

A total of 1,246,704 pounds of solvent was put into the system of 9204-4 plant as of October 1, 1953.

J. E. Smyrl

JES:wa

according to our calculations this figure should read 1,241,224 pounds
QJB 10-29-53

INTER-COMPANY CORRESPONDENCE

(INSERT NAME) COMPANY CARBIDE AND CARBON CHEMICALS COMPANY LOCATION Post Office Box P OAK RIDGE, TENN.

M-195

TO LOCATION J. R. Barron

ATTENTION

COPY TO W. K. Whitson, Jr.
D. A. Jennings
J. E. Smyrl (File)

DATE November 1, 1953

ANSWERING LETTER DATE

SUBJECT Solvent Inventory

Y/HG-0454

Confirming telephone report of solvent on inventory in 9204-4, 11-1-53.

Bottles	Lbs.
1,167	88,692

J. E. Smyrl

JES:wa

27 (3) Solvent

E-27(3)

INTER-COMPANY CORRESPONDENCE

(INSERT NAME) COMPANY CARBIDE AND CARBON CHEMICALS COMPANY LOCATION Post Office Box Y OAK RIDGE, TENN.

TO Mr. B. W. Harrigan
LOCATION Bldg. 9704-2, K-12 Plant

DATE October 27, 1954

ANSWERING LETTER DATE

ATTENTION

SUBJECT Solvent Transfer from K-10

Y/HG-0083/7

COPY TO Mr. J. W. Garland
Mr. W. A. Pryor
Mr. J. B. Gaukler
Mr. L. G. Ellis
Mr. E. Barton
Mr. W. L. Whitson, Jr.
Mr. H. C. Mahoney
Mr. J. B. Bowers
File...No K-12 MC

not in ages. Scott 1954

We have completed the transfer of Solvent from K-10, a recap of action taken follows:

To Account 8803:

		Credit Account	Value
42,688 lbs.	753 cyl.	43003-61	$107,591.66
20,780 lbs.	370 cyl.	33705-70	52,731.80
62,948 lbs.	823 cyl.		$160,122.86 Total

To Account 8900-525:

1,140 lbs.	15 cyl.	43003-61	2,918.40
1,824 lbs.	24 cyl.	33705-61	4,669.44
190,760 lbs.	2,510 cyl.	33705-70	488,383.60
			495 933.44
193,724 lbs.	2,549 cyl.		[illegible] Total
	Total Value of Solvent Transferred		[illegible]
			656 654.32

Our account 3807 has been charged with P.D.A. in the following amounts:

	Credit Account		Value
4,180 gal.	33705-70	@ 7.85	$31,977.00
605 gal.	3807	@ 7.65	4,628.85
4,785 Gal.			$36,605.85 Total

Yours truly,

Gurnee Scott
Materials Department

APPROVED FOR PUBLIC RELEASE
7/7/54
Technical Information Office Date

Gurnee Scott:dp

THIS FORM FOR INTER-COMPANY CORRESPONDENCE ONLY

cys 4A - Strasser
5A - Whitman
6A - Whitson
7A - Moore

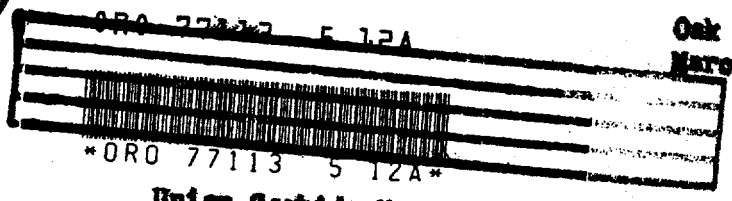
ASSIFIED

UNITED STATES
ATOMIC ENERGY COMMISSION

In Reply
Refer To: OPO:REL

M-603

Strasser: Please prepare reply.
JFM
Whitson: Please handle.
GS



Oak Ridge, Tennessee
March 21, 1956

Classification changed to Unclassified
(Insert appropriate classification level and category)
by authority of YSA-858 8-30-94
(Authority for change in classification) (Date)
by Audrey Wyndham 9-14-94
(Signature of person making change) (Date)
Verified by R J Green 9-15-94
(Signature of person verifying change) (Date)

Union Carbide Nuclear Company
Post Office Box P
Oak Ridge, Tennessee

Attention: Mr. C. E. Center, Vice President

Subject: SHUTDOWN OF BETA-4 PLANT

(Y/HG-0535)

Gentlemen:

Reference is made to your letter dated February 21, 1956, subject, "Colex Development and Production Planning."

We have been advised that the General Manager has authorized the temporary shutdown of the Beta-4 Plant as a means of accelerating the cleanup of the mercury health problem in the ADP alpha plants. This authorization was granted with the understanding that the Beta-4 Plant would be in a ready standby condition requiring only three months to be back in full operation.

It is requested that you develop information, using the experience in the shutdown of the Beta-4 Plant, on the following standby cases:

Ready Standby (requiring 90-days to be in full operation)

(a) Cost of shutdown, monthly cost, and startup cost;

(b) What was done in placing the facility in this standby condition.

Long-Term Standby (equipment intact; protective measures to prevent serious deterioration)

(a) Cost of placing facility in this condition, monthly cost, and probable cost of reactivation;

(b) Time to reactivate plant;

(c) What will be done to place the facility in this condition;

(d) What must be protected against deterioration in a long-term standby.

RECEIVED
MAR 26 1955
Y-12
SUPERINTENDENT

APPROVED FOR PUBLIC RELEASE
Technical Information Office
Date 1/5/95

DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW
Determination: 2,4 [Insert Number(s)]
1. Classification Retained
2. Classification Changed To: U
3. Contains No DOE Classified Information
4. Classification Cancelled
5. Classified Information Bracketed
6. Other (Specify):
1st Reviewer: K Bayless Sy (Name)
Authority: ADC ADD
Date: 8/25/94
2nd Reviewer: M Mullen (Name)
Authority: ADD
Date: 8/26/94

MMES QA
Y-12 Classification Office
Name: [illegible]
Date: 12-15-94

UNCLASSIFIED

ORO 77113

We would like to know the effect of each of the above standby conditions on solvent inventory requirements and future make-up requirements. Pending a clarification of these needs we are requesting that delivery of the remaining 4,000 flasks of mercury scheduled for delivery to us from G.S.A. by the end of the current fiscal year be delayed until sometime in FY 1957.

We congratulate you and your staff on the outstanding contributions you have made on the thermonuclear program. The crash effort on which the design and construction of the Beta-4 Plant was based makes your achievements even more remarkable. As you are aware, construction on this plant was completed in about 17 months and from the date of first product withdrawal on August 24, 1953, operations in the plant were uninterrupted. The initial production from the plant was approximately 200 percent beyond initial plant design and by minor plant modification the initial production of the plant was increased by better than 250 percent in approximately fifteen months after plant start-up. The contributions by your operations, engineering design, and development personnel represents a job "well done".

You will be advised promptly as we receive further information regarding the standby status of the Beta-4 Plant.

Very truly yours,

ORIGINAL SIGNED BY
S. E. BENDER

for S. R. Sapirie
Manager
Oak Ridge Operations

cc: Mr. N. A. Shearon
Dr. W. H. Woodruff

3 cy Ellis please handle M-510 JRM 7/18/56

UNITED STATES
ATOMIC ENERGY COMMISSION

In Reply
Refer to: OPO:FRC

Oak Ridge, Tennessee
July 17, 1956

(Y/HG-0503/4/DEL REV)

Union Carbide Nuclear Company
Post Office Box Y
Oak Ridge, Tennessee

Attention: Mr. J. P. Murray, Y-12 Plant Superintendent

Subject: ALPHA-5 PROJECT

Gentlemen:

This is to advise that during the preparation of the ORO FY-1958 Budget the following items of work were approved as part of Project 224X-4070, Alpha-5. The items are identified in the following references:

Letter - June 14, 1956, J. P. Murray to R. C. Armstrong, subject, "Development Program For Hydraulic Spinning".

Letter - June 5, 1956, J. P. Murray to R. C. Armstrong, subject, "Transfer of Costs".

Letters- April 25, 1956, and April 30, 1956, C. E. Center to S. R. Sapirie, subject, "Budget Estimates For General Plant Projects - Fiscal Years 1956, 1957, and 1958".

	ITEM	TO ALPHA-5 PROJECT
1.	Equipment Ventilation and Cooling, 9201-4 & 5	$ 490,000
2.	Reflux Filtering Systems, 9201-4 & 5	600,000
3.	Process Air Exhaust Scrubbers, 9201-4 & 5	546,000
4.	Absorber and Cascade Area Ventilation, 9201-4 & 5	500,000
5.	Tray Voltage Scanner, 9201-4	26,926
6.	Evaporator, 9211	45,000
7.	Transformer Feed Rectifier, 9201-4	8,000
8.	Aspen Drying System, 9204-2	5,000
9.	Dry Chemistry Reactor, 9212	4,200
10.	Overflow Tank for Emergency Decomposer, 9201-5	10,000
11.	Dry Chemistry Protective Devices, 9212	9,500
12.	Dry Chemistry Protective Devices, 9206	10,000
13.	Depleted Metal Furnace, 9211	120,600
14.	Evaporator Backwash Equipment, 9201-4	27,566
15.	Pressure Vessel Equipment, 9204-2	30,000
16.	Floor Drain Sump Tanks, 9201-5	60,208
17.	Spinning Lathe	150,000
	Total	$2,643,000

We would appreciate it if you would request a directive modification to Directive No. Y-12 - 101A for the Alpha-5 Project and furnish us a breakdown of cost between participants for these items.

Very truly yours,

Charles A. Keller

Charles A. Keller
Acting Director
Production Division

CC: Mr. C. E. Center
Mr. L. B. Emlet
Dr. N. H. Woodruff
Mr. N. A. Shearon
Mr. R. J. Brown

INTER-COMPANY CORRESPONDENCE

UNION CARBIDE NUCLEAR COMPANY

A Division of Union Carbide and Carbon Corporation

To: Mr. Nelson Bethea
Building 9704-2

Plant: Y-12

Y/HG-0314

Date: December 13, 1957

Copies To: Mr. W. C. Moore
Mr. R. C. Olson
Mr. R. A. Walker
File

Subject: Solvent Inventory
Building 9201-2 (U)

M487

Physical inventories of the solvent in the pilot plant facilities in Building 9201-2 have been made at very infrequent intervals due to the difficulty of taking such inventories and also because the required shut-down time could not be arranged during the period of intense development effort in 1954-1955. The following information which has been taken from our records does not include all of the inventories which were made, but does serve to point out the periods when major losses occurred.

Date	Transaction	Account	Pounds	Cumulative Pounds
1-22-54	Inventory*	Capital	50,000	-
1-22-54	Inventory*	Dept. 2301	82,969	132,969
3-14-54	Receipts	Capital	77,368	210,337
5-21-54	Inventory	All	204,500	
7-12-54	Receipts	Capital	100,016	310,353
2-4-55	Receipts	Capital	7,600	317,953
2-25-55	Receipts	Capital	3,800	321,753
7-55	Inventory	All	200,574	
10-55	Inventory	All	196,139	
11-55	Inventory	All	189,703	
2-56	Inventory	All	188,084	
12-56	Inventory	All	159,906	
9-57	Inventory	All	156,311	156,311
		Total Losses		165,442
		Less Dept. 2301 Solvent		82,969
		Net Loss of Capital Solvent		82,473

Last in Report Kite 1957

The inventory made in September, 1957, is not, of course, extremely accurate. It is expected that the solvent will be weighed when the facilities are cleaned out in the near future. A more accurate inventory will be supplied to you at that time.

H. T. Kite
H. T. Kite

bjh

*See letter of January 25, 1954 - G. A. Strasser to R. J. Barron, et al.

UNCLASSIFIED

INTER-COMPANY CORRESPONDENCE

UNION CARBIDE NUCLEAR COMPANY
A Division of Union Carbide and Carbon Corporation

To: Mr. N. H. Bethea
Building 9704-2

Copies To: Neal Dow
G. W. Evans
W. C. Moore
R. C. Olson
R. A. Walker
L. E. Burkhart
File (Y-12RC)

Classification changed to Unclassified (Insert appropriate classification level and category) by authority of Y/ES-858 9-2-94 (Authority for change in classification) (Date)

by Audrey Wyckham 9-14-94 (Signature of person making change) (Date)

Verified by R G Evans 9-15-94 (Signature of person verifying change) (Date)

Plant: Y-12

Date: March 13, 1958

Subject: Solvent

Y/HG-0445

M784

MMES QA
Y-12 Classification Office
"This docu... defined in t... its transfer ... contents in... person is pro...
Name: LSmissill
Date: 12-15-94

Our letter of December 13, 1957, to you outlined the quantities of solvent procured for the Pilot Plant Facilities in Building 9201-2 and the various inventories. The total quantity was 321,753 pounds of which 238,784 was capital material and the remaining 82,969 pounds was paid for out of operating funds.

The facilities in Building 9201-2 have now been drained and the solvent inventory summary is as follows:

	Pounds
Transferred to 9201-5	162,390
Transferred to 9201-4 Laboratory	105
Radiation Shielding, Dept. 2301, 9205	3,211
Transferred to Acct. 4380-24 (June, 1957)	3,021
On loan to X-10 (C. V. Chester)	1,049
Estimated quantity yet to be recovered from piping etc. in 9201-2	2,000
Total	171,776

The quantity now on loan to Mr. Chester of ORNL, X-10, along with any solvent which may be recovered during the final stripping of Building 9201-2 will be transferred to Alpha-5 at a later date. We will inform you at that time as to the exact quantities.

The quantity being used in Building 9205 is necessary for the performance of required work. This solvent can be returned to the stockpile some time in the future.

DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW
1st Reviewer: [illegible] (Name)
Authority: ☐ ADC ☐ ADD
Date: 8-31-94
2nd Reviewer: ☒ K. McConnell, Jr. (Name)
Authority: ☒ ADD
Date: 9-2-94
Determination 4 (Insert Number(s))
1. Classification Retained
2. Classification Changed To:
3. Contains No DOE Classified Information
4. Classification Cancelled
5. Classified Information Bracketed
6. Other (Specify)

H. T. Kite

APPROVED FOR PUBLIC RELEASE
1/5/95
Technical Information Office Date

UNCLASSIFIED

WC [illegible] 8-55 [illegible] Form for Inter-Company Correspondence [illegible]

INTER-COMPANY CORRESPONDENCE

UNION CARBIDE NUCLEAR COMPANY

A Division of Union Carbide and Carbon Corporation

M-223

To: Mr. H. H. Bethea
Building 9704-2

Plant: Y-12

Date: March 13, 1958

Copies To: Neal Dow
G. W. Evans
W. C. Moore
R. C. Olson
R. A. Walker
L. E. Burkhart
File (Y-12RC)

Subject: Solvent

Our letter of December 13, 1957, to you outlined the quantities of solvent procured for the Pilot Plant Facilities in Building 9201-2 and the various inventories. The total quantity was 321,753 pounds of which 238,784 was capital material and the remaining 82,969 pounds was paid for out of operating funds.

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The quantity being used in Building 9205 is necessary for the performance of required work. This solvent can be returned to the stockpile some time in the future.

UNCLASSIFIED
Derivative Classifier R. McGill Cons.
(Name and title)

H. T. Kite

bjh

FEB 6 1990

INTER-COMPANY CORRESPONDENCE

UNION CARBIDE NUCLEAR COMPANY

A Division of Union Carbide and Carbon Corporation

M-223

To: Mr. P. J. Pryor ✓
K-1001, K-25

Plant: Y-12

Date: March 18, 1958

Copies To: Mr. J. A. Ellis
Mr. D. W. Harrigan
Mr. Corum Scott
Mr. N. H. Bethea
File

Subject: CHARGE-OFF OF PILOT PLANT SOLVENT LOSS TO PRIOR YEARS' COST

In the capitalization of Project 4070 Solvent, 208,186 pounds were alloted to the Pilot Plant Facilities in Building 9201-2. Y-12 Property Department Voucher D-18933-Y represents the accounting media to substantiate this unit of capital assets representing a total cost of $929,632.44. Subsequent vouchers D-21421-Y and D-21621-Y representing price adjustments revised the total cost of this solvent to $891,503.87. This solvent in Building 9201-2 was capitalized as a non-depreciable item as per the recommendation of the U.S.A.E.C.

Since the Pilot Plant has served its purpose and no further use is foreseen, a stripping operation of this facility is now underway. All solvent has been removed from the lines and transferred to Buildings 9201-4 and 9201-5. The amount of solvent transferred to these buildings amounted to 162,390 pounds representing $502,353.79 in cost. The balance of 125,796 pounds at a total cost of $389,150.08 was lost during the operation of the above mentioned pilot plant during fiscal years 1956 and 1957.

Please accept this correspondence as a formal request to charge the cost of the solvent lost to prior years' cost. This charge will be in the amount of $389,150.08.

Finance and Materials Division

E.C.Ellis
JKD:pm

UNCLASSIFIED
Derivative Classifier R. McGill Cons.
(Name and title)
FEB 6 1990

~~CLASSIFIED~~

INTER-COMPANY CORRESPONDENCE

UNION CARBIDE NUCLEAR COMPANY

A Division of Union Carbide and Carbon Corporation

To: Mr. N. H. Bethea

Building 9704-2

Plant: Y-12

Date: June 27, 1958

Subject: Solvent

Copies To: L. E. Burkhart
Neal Dow
G. W. Evans
R. C. Olson
G. A. Strasser
R. A. Walker
H. T. Kite (Y-12RC)

Y/HG-0447

MMES QA
Y-12 Classification Office
Name: ASMurrill
Date: 12-15-94

TA data as of 1954. of its thorized

Final stripping of the Pilot Plant facility in Building 9201-2 has been completed and all solvent which could be recovered in the liquid state has been removed from that building. As given in our letter of March 13, 1958, the total quantity of solvent originally charged to the Pilot Plant operations was 321,753 pounds of which 238,784 pounds were in a capital account with the remaining 82,969 pounds having been paid for out of operating funds. Final accounting results in the following information.

	Pounds
Transferred to 9201-5	179,210
Transferred to 9201-4 lab	105
Transferred to account 4380-24 (June, 1957)	3,021
Transferred to Dept. 2301, Bldgs. 9202 and 9205	4,260
Total	186,596

It is requested that the quantity now being held by Department 2301 be charged to FY 1958 expense, Account 2302.

APPROVED FOR PUBLIC RELEASE
1/5/95
Technical Information Office Date

H. T. Kite

bjh

DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW

1st Reviewer: J. T. Bowers (Name)
Authority: ☒ ADC ☐ ADD
Date: 8/31/94
2nd Reviewer: R Baylor Jr (Name)
Authority: ☒ ADD
Date: 9/6/94

Determination 4, 2 (Insert Number(s))
1. Classification Retained
2. Classification Changed To: U
3. Contains No DOE Classified Information
4. Classification Cancelled
5. Classified Information Bracketed
6. Other (Specify)

Classification changed to Unclassified
(Insert appropriate classification level and category)
by authority of YSA-858 9-6-94
(Authority for change in classification) (Date)
by Audrey Windham 9-14-94
(Signature of person making change) (Date)
Verified by R F Fraser 9-15-94
(Signature of person verifying change)

~~UNCLASSIFIED~~

17-4081

INTER-COMPANY CORRESPONDENCE

UNION CARBIDE NUCLEAR COMPANY

A Division of Union Carbide and Carbon Corporation

Don Lon please handle From M-223 SWO

To: Mr. N. H. Bethea
Building 9704-2

Plant: Y-12

Date: June 27, 1958

Subject: Solvent

Copies To: L. E. Burkhart
Neal Dow
G. W. Evans
R. C. Olson
G. A. Strasser
R. A. Walker
H. T. Kite (Y-12RC)

Final stripping of the Pilot Plant facility in Building 9201-2 has been completed and all solvent which could be recovered in the liquid state has been removed from that building. As given in our letter of March 13, 1958, the total quantity of solvent originally charged to the Pilot Plant operations was 321,753 pounds of which 238,784 pounds were in a capital account with the remaining 82,969 pounds having been paid for out of operating funds. Final accounting results in the following information.

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H. T. Kite

bjh

UNCLASSIFIED

Derivative Classifier R. M. Gills, Cons.
(Name and title)

JUN 27 1958

WCX-163 (8-55) This form for Inter-Company Correspondence only

return to file

DRAFT NO.

CONFIDENTIAL

UNCLASSIFIED

HISTORY OF HANDLING EXCESS MERCURY AT MATERIALS DEPARTMENT IN BLDG. 9720-26 BY THE Y-12

BACKGROUND DATA M-750

(8)

Y/HG-0372

Except for traffic arrangements of mercury shipments, Y-12 Materials Department had little or nothing to do with mercury prior to the early 1960's. In or about late 1963, Y-12 Materials Department was delegated the responsibility for the receipt, storage, accountability and shipment of excess mercury.

In November, 1963, Building 9720-26 was completed. This building was constructed for the sole purpose of mercury storage. The concrete floor was designed with a slight downgrade to the north side. A small trough was built along the north wall at floor level with a trap at the center. This was designed as a safety control to catch and trap any mercury that spilled or leaked while in storage.

APPROVED FOR PUBLIC RELEASE
Technical Information Office 1/30/95 Date

The Arc Melting Department of Metal Preparation Division was responsible for the recovery and flasking of mercury. After this department filled the flasks, marked for identification each flask and pallet, and made proper documentation, the mercury was transferred to Y-12 Materials Department. In the early years, 1964-1976, Arc Melting transferred mercury to Y-12 Stores in quantities of 25

DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW
1st Reviewer: [illegible] (Name)
Authority: ☒ ADC ☐ ADD
Date: 8-31-94
2nd Reviewer: O. K. McConnell (Name)
Authority: ☒ ADD
Date: 9-1-94
Determination 4, 2 (Insert Number(s))
1. Classification Retained
2. Classification Changed To: U
3. Contains No DOE Classified Information
4. Classification Cancelled
5. Classified Information Bracketed
6. Other (Specify)

Classification changed to Unclassified (Insert appropriate classification level and category)

by authority of Y/SA-858 9-1-94 (Authority for change in classification) (Date)

by Audrey Windham 9-14-94 (Signature of person making change) (Date)

Verified by R A Fraser 9-15-94

UNCLASSIFIED

MMES QA
Y-12 Classification Office
Name: K Murrill
Date: 12-19-94

and 44 flasks per pallet. In recent years, all transfers have been made in pallets containing 45 flasks. The tare weight of flasks is approximately nine (9) pounds, and 76 pounds of mercury is placed into each flask.

In 1976, an extensive program was initiated for recovery and rebottling of mercury. At the same time, the mercury warehouse (9720-26) was renovated. Special care was taken to upgrade the floor and lower wall. The trough and trap were also refurbished to provide for safer handling in event of spills or leaks. No spills or leaks have been found since the recovery and rebottling program was started in 1976.

The Materials Department is responsible for the control and accountability of excess mercury. Entry into the mercury warehouse (9720-26) is controlled by Stores supervision. Industrial Hygiene is utilized to make periodic checks for mercury vapor in building 9720-26. During warm and hot seasons of the year, the building is opened and ventilated prior to entry. Adequate warning signs are posted outside the mercury warehouse.

All shipments of mercury fully comply with transportation regulations.

NOTE: See attached copy of Department Procedures (2.27) and typical Bill of Lading for shipping.

UNCLASSIFIED

13,578 square feet and is constructed primarily with a concrete base (floor) and concrete block walls. Provisions were designed into the building to collect and trap any mercury leaks or spills.

Question: Who has access to mercury storage?

Answer: Primary control is through Stores Department supervision, and the mercury warehouse is within the confines of the Y-12 installation security area. This warehouse is locked at all times except when attended by appropriate Materials Department personnel. A log is maintained for all individuals entering this building.

Question: What has been the experience with spills and leaks?

Answer: To the best of our knowledge, no spills or leaks have occurred since 1976. Prior to this date, leaks were experienced as a result of deteriorated flasks.

However, the mercury that did leak from deteriorated flasks was trapped, recovered, and rebottled in new flasks. As such, no actual loss of mercury occurred from the mercury storage warehouse.

10-10-62 J M Case (2) File (1)
M Case
Please handle
RFH
Copy made for E.C.Ellis
10-12-62

CONFIDENTIAL
UNITED STATES
ATOMIC ENERGY COMMISSION

cy: R. F. Hibbs - 3
R. G. Jordan
R. A. Winkel
O. Rinehart

IN REPLY REFER TO:

OPO:StGTA UNCLASSIFIED Oak Ridge, Tennessee
October 3, 1962

RFH: Please do.

JPM 10/9/62

Y/HG-0276

Union Carbide Nuclear Company
Post Office Box P
Oak Ridge, Tennessee

Attention: Dr. C. E. Larson, Vice-President

APPROVED FOR PUBLIC RELEASE
12/2/94
Technical Information Office Date

Subject: SHUT DOWN OF ALPHA-4 PLANT

Gentlemen:

Recently the Commission decided to discontinue the production of Lithium-6 because the present inventory and the scheduled returns would provide the weapon's requirement of Lithium-6 for a period of approximately three years. Accordingly, pursuant to Articles I and II of Contract No. W-7405-Eng-26, you are hereby instructed to take the following steps to implement the Commission's decision:

1. Discontinue production of Lithium-6 in Alpha-4 as soon as practicable.

2. Produce 5,000 kilograms of Lithium-7 of 99.99% enrichment utilizing the appropriate cascades in the Alpha-5 Plant.

3. Place the Alpha-4 facility in such standby condition that production could be resumed upon six months notice. Do not remove process equipment from this building.

4. Utilize the power which will become available from shut down of the Alpha-4 facilities in other Oak Ridge operations, principally in the ORGDP.

DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW
Determination 2, 4 [Insert Number(s)]
1. Classification Retained
2. Classification Changed To: U
3. Contains No DOE Classified Information
4. Classification Cancelled
5. Classified Information Bracketed
6. Other (Specify):
1st Reviewer: T. F. Hugh (Name) Authority: ADC ADD Date: August 1994
2nd Reviewer: R J Fraser (Name) Authority: ADD Date: 8-10-94

SUPERINTENDENT

MMES QA
Y-12 Classification Office
Name: R Emmett
Date: 11-2-94

Classification changed to UNCLASSIFIED
(Insert appropriate classification level and category)
by authority of Y/SA-858 8-10-94
(Authority for change in classification) (Date)
by Audrey D. Windham 8-16-94
(Signature of person making change) (Date)
Verified by R J Fraser 8-17-94
(Signature of person verifying change) (Date)

CONFIDE

UNCLASSIFIED

We thank you for your cooperation in this matter.

Very truly yours,

for S. R. Sapirie
Manager
Oak Ridge Operations

CC: Mr. R. C. Armstrong

Wednesday, April 15, 1992

35 CENTS

Y-12 building study a poser

Alpha 4 clean-up challenges DOE

by Paul Sloca
Oak Ridger staff

The Department of Energy is currently studying ways to decontaminate and decommission (D&D) a building at the Oak Ridge Y-12 Plant that contains more than 250,000 pounds of mercury.

The Alpha 4 building, which once held the world's largest supply of mercury, was one of the primary sources of mercury that flowed into East Fork Poplar Creek, along with mercury from a second building, Alpha 2, and other, smaller sources.

More than 239,000 pounds of mercury were dumped into East Fork Poplar Creek from various sources at Y-12 in the past.

Alpha 4, which has been closed since 1963, has very large amounts of mercury still in it, according to Jane Powell, who is D&D program manager for the DOE's Oak Ridge Field Office.

"It is fair to say that the entire building is permeated with mercury," Powell said. "There is also asbestos contaminated with mercury in the pipes and there is still mercury in the columns."

According to Powell, the facility, which operated for eight years, pumped more than 9 million pounds of mercury through the building on a daily basis during the height of the Cold War.

Mercury is a heavy silver-white poisonous metallic element that is liquid at ordinary temperatures and is used in some activity involving weapons production.

"There are areas of the building where you can look down on the equipment and see small pools of mercury," Powell said.

Powell also said that during its

ALPHA: DOE considers what to do with building full of mercury

· Continued from Page 1

peak, there were instances at the building, when in a rush to get work completed, improper pumps would cause mercury to be sprayed throughout the building.

The D&D work, which was formally transfered to a D&D program person in January, is the first kind of building work of this nature at Y-12.

> "... you can look down on the equipment and see small pools of mercury."
> Jane Powell

Department of Energy officials involved in managing environmental cleanup on the Oak Ridge Reservation include, from left to right, Bill Adams, assistant manager for environmental restoration and waste management; Jane Powell, decommissioning and decontamination program manager; Suzy Riddle, Oak Ridge National Laboratory program manager and Sherry Lankford, Y-12 Plant program manager. — Courtesy photo

"We've been doing surveillance and maintenance and and we've been working out what needs to be done for D&D," Powell said. "In fact, we are working on a conceptual design report for that building."

Powell said that report includes what needs to be done, what technology needs to be developed and how cleanup will be done. One of the problems is the kind of waste that will be generated and where it will be stored.

Powell said there could be traces of uranium taken out of the building which would add to the extent of cleanup needed.

"It's a very great challenge; it's a very big building," Powell said. "Another complication is it's sitting in the middle of an exclusion zone."

An exclusion zone is an area where classified operations take place.

An additional cost of cleaning up at Alpha 4 would be accrued to get special clearances for workers to begin D&D work.

More than $3 million was budgeted for D&D preliminary work at Alpha 4 with between $5-$7 million for fiscal 1993.

"Out highest priority is keeping the building safe," Powell said. "The priority for tearing down — well, the funding's not there."

Powell added that the brick structure is still in good shape and the only repair that would be needed is re-roofing. However, daily checks have shown no signs of leaks.

Another problem is that even though the engineering involved in the cleanup is available, release limits on the amount of contamination deemed acceptable by regulation has not yet been established for the waste that is generated.

"Creating more waste than I have more room for isn't logical so the best for me to do is keep the building safe," Powell said.

More than 105 buildings are scheduled for D&D activities in buildings at the three DOE sites in Oak Ridge, but the future of Y-12 and the downsizing of its existing facilities has yet to be determined.

The future of D&D work could become clearer once DOE headquarters in Washington approves a new mission statement for Y-12.

File - Alphas Abandonment

UNION CARBIDE CORPORATION
NUCLEAR DIVISION
P. O. BOX Y, OAK RIDGE, TENNESSEE 37831

November 12, 1964

M-464

Y/HG-0160/2

United States Atomic Energy Commission
Post Office Box E
Oak Ridge, Tennessee

Attention: Mr. C. A. Keller

ABANDONMENT OF ALPHA-5 FACILITIES AT OAK RIDGE

Gentlemen:

Reference is made to your letter on the above subject dated September 11, 1964, and to our reply dated September 25, 1964. The latter indicated our intention of completing the mercury withdrawal by about January 15, 1965. This was to be done by bottling the mercury on a two-shift, five-day schedule.

Operating problems have, however, arisen in the Delta Facility which made it necessary on October 19 to interrupt the two-shift schedule on mercury bottling. This situation is expected to continue until the latter part of November, when the two-shift mercury operation will be resumed. The resulting delay in mercury withdrawal will defer completion of this work until the end of February, at which time the Alpha-5 Colex installation can be removed from standby status.

We transmit herewith four floor-plan drawings of Building 9201-5 which have been marked to show those areas of the building in which operations will continue after the abandonment of the Colex equipment. The major operations include the Thorium and Special Metals Facilities, refrigeration equipment, air-compressing and drying equipment and a number of building services including elevators, cranes, and ventilation equipment. The ventilation system must remain in operation to obviate the accumulation of hazardous levels of air-borne mercury, since a considerable amount of mercury will remain in the building even after the equipment has been drained and flushed.

Plans for the orderly removal of the Colex equipment have been made. Our Plant Engineering Division has been designated to coordinate such removals, and questions regarding the availability or suitability for reuse of any equipment may be directed to them.

Very truly yours,

R. F. Hibbs

R. F. Hibbs
Y-12 Plant Superintendent

RSW:cc

Enclosures (4)

M-461

Distribution:

C. A. Keller (2)
J. M. Case
C. E. Center
W. E. Heckert
C. C. Hopkins
G. R. Jasny
R. G. Jordan
J. A. Swartout
R. D. Williams
R. A. Williamson (Y-12RC)
R. A. Winkel
File

UNION CARBIDE

INTERNAL CORRESPONDENCE

NUCLEAR DIVISION — POST OFFICE BOX Y, OAK RIDGE, TENNESSEE 37831

To (Name) Mr. J. W. Ebert — Date June 4, 1965

Company

Location Building 9734 — Originating Dept.

Answering letter date

Copy to D. A. Jennings (Y-12NoRC) — Subject Alpha 5 Stripping

Y/1Hq-0246/3

The stripping of Alpha 5, started on March 29, 1965, has progressed slowly, but reasonably well considering the limited manpower assigned and the variable and odd-hours availability of shift personnel. The permanently assigned Maintenance stripping crew has consisted of only 6 men, but the equivalent of 4.7 men has been realized from work done by the shift Maintenance force. Additional labor, averaging 2 men, has been gained by occasional short-term loans from the various Maintenance departments, and 1.2 men have been used by Salvage in stripping nickel anodes from absorber bonnets. The total Maintenance force has averaged 13.9 men. Support labor provided by Process Operators and Health Physics personnel amounts to 2.7 and 0.34 men.

Stripping to date has been confined largely to the top level of Cascades 1 through 4 and the absorber rooms. Most progress is shown in Cascades 3 and 4, which are practically stripped at the top level, and in Absorber Banks 3 and 4, where tray removal may begin at the first opportunity. Tray bonnets have been removed from all absorber rooms and, although not all removed, considerable piping has been cut down at the top level of Cascades 1 and 2 and in Absorber Banks 3 and 4. The estimated weight of material removed amounts to 1,244,000 pounds, or 6.5 percent of the estimated total. This compares favorably with the labor applied, 7.0 percent of the original estimate including support assistance.

Little equipment has been stripped as yet, but the few items removed have been stored at the Building 9929-1 yard for excessing by Stores. The tray bonnets, stored on the Salvage Yard, are being stripped of the nickel anodes; and separate collections of piping, C-clamps, instruments, column distributor sections, and anode cooling water lines and valves are being made. No sales have been made, but quantities of these items will be offered in July in conjunction with sales of other plant scrap. These sales will "measure the market," provide a basis for an accurate estimate of scrap values, and perhaps provide information of value in planning future sales.

Problems associated with the stripping work have been minor or anticipated. Mercury vapor readings in the immediate stripping area are frequently above maximum allowable limits, and respirators are required. Readings are taken twice daily. Efficiency is hampered by the size of the crew, imbalance of crafts, and the erratic availability of shift and loaned personnel. The Union at the Chief Steward level has complained frequently, usually regarding craft lines. Much conversation has been required, but the few grievances filed have been dropped at the first level.

The present labor force in Alpha 5 cannot be increased prior to July, and it is not expected that any appreciable increase can be made before October. At the present rate, about 30 months would be required to strip the building; if the force can be doubled during the fall and winter months and maintained, not more than 18 months will be required.

ORIGINAL SIGNED BY
D. A. JENNINGS

D. A. Jennings

DAJ:df

bc: Mr. J. W. Minchey

ALPHA 5 STRIPPING

The percentage of work completed progressed from 43.4 to 50.1 percent. Manpower employed remained essentially the same, 27 men, but it fell short of the projected total of 33.4.

Absorber Rooms 1 through 6 are completely stripped, and Cascades 5 and 6 lack only removal of a few columns. These two cascades will be finished in early February. Progress is at varying stages in the remaining Cascade and Feed Preparation Areas.

Several requests from other government agencies for equipment items have been received. These will be filled during February, and the primary effort will then be shifted to clearing the Feed Storage Area.

Total weight of material removed this month amounted to 704,000 pounds; to date, 6,240,000 pounds have been removed.

JANITORIAL DEPARTMENT

The labor crew, switched to the evening shift for janitorial project work, has been confined to vacuum cleaning, wall washing, and floor finishing. The majority of the 1228 man-hours available in January were used in four ORNL buildings, but some work was done in Building 9995.

The total area serviced increased by 3,122 square feet to a total of 2,806,744. The increase consisted of new offices in Building 9207, and it will require 0.45 men per day.

SALVAGE

One sale, consisting of 2,100,000 pounds of mixed metal, largely ferrous, and 96,600 pounds of nickel, was held in January. The nickel lot was entirely Alpha 5 material, and the mixed lot contained 968,550 pounds of Alpha 5 scrap. The price received for the nickel, 71+ cents, was comparable to that of prior sales; however, the mixed scrap price, 1.39+ cents per pound, was slightly better than any received since General Plant Maintenance has had the responsibility for separation of scrap metals.

The next sale of scrap metals, which will include both normal plant and Alpha 5 materials, is planned for March.

Jennifer —
I don't know what this Nickel is doing in A-5. I know they used silver in the electrical systems.

INTERNAL CORRESPONDENCE

M-781

CLEAR DIVISION

POST OFFICE BOX Y, OAK RIDGE, TENNESSEE 37831

To (Name) Mr. R. D. Williams
Company
Location Building 9212

Date April 12, 1966
Originating Dept. Arc Melting
Answering letter date Y/HG-0070/10 DEL REV
Subject Mercury Recovery Meeting

Copy to I. G. Speas
R. E. Hulme
V. B. Gritzner
J. W. Minchey
File (NoY-12RC)

A meeting was held at 1:30 pm, April 7 to discuss the status of the exploration for mercury in Building 9201-5 Fan Room F. Those in attendance were I. G. Speas, R. E. Hulme, V. B. Gritzner, J. W. Minchey and D. W. Smith.

Mr. Hulme reported that there was no evidence of a large deposit of mercury and that the signals from the electronic pipe finder were getting weaker. This indicates a dispersion of that "vein" of mercury originally found.

In view of the lack of a large deposit of mercury it was decided before further excavation were done to determine the assay of the dirt. From this an estimate of cost and material could be made. It was also decided to take two core-drill samples near the sump in the north end of the fan room to determine if any mercury and in what quantities had reached this point. Mr. Hulme was to work with J. J. Kurtz and John Minchey in procuring the samples and fixing the spots for core drilling.

D. W. Smith

ed

UNION CARBIDE CORPORATION
NUCLEAR DIVISION
P. O. BOX Y, OAK RIDGE, TENNESSEE 37830

April 26, 1966

M-479

Y/HG-0274/12

United States Atomic Energy Commission
Post Office Box E
Oak Ridge, Tennessee

Attention: Mr. C. A. Keller

Gentlemen:

Request for Modification, Form OR-638, Work Order S-1921,
Strip Colex Equipment, 9201-5

Reference is made to the subject Form OR-638, approved March 9, 1965, which established September 30, 1966, as the completion date for this work. It is requested that this completion date be extended to June 30, 1967.

We will halt the stripping operation on May 1, and will resume it on October 1, in order to avoid the increased health hazards attendant upon this work during the approaching warm weather. Although work could, if essential, continue during this period, the much higher costs of personnel protection and cleanup would reduce the return from the salvage work and effectively render the operation uneconomical. Another consideration is that the Plant maintenance workload rises during the summer, and can benefit by the services of the personnel now involved in the stripping operation. Those commitments now outstanding to other government agencies will be honored before the work is interrupted.

Very truly yours,

R. F. Hibbs
Y-12 Plant Superintendent

RSW:ml

cc: C. A. Keller (9)
C. E. Center
R. F. Hibbs
J. W. Ebert
C. C. Hopkins
G. R. Jasny
C. E. Larson
G. W. Mitchel (2)
D. H. Rader
Oral Rinehart
J. L. Waters (Y-12RC)

Not in 9/94 1966

L-4 standby shutdown (cont'd)

Y/HG-0275 (M480) proposed costs 9/62 "proposed Colex shutdown and Marble production run"
copy -0276 "the story"
-0277 at 25/50/75/100% of capacity
-0482 proposed manhrs to strip

L-5 shutdown

Air Data? 6 copies - NO

copy p.1 (M468) -0160/2 11/12/64
/4 6/21/65 "all Hg has been removed"
copy p.4 (M64) -0024 alpha-4 auxiliary inventory 5-1-62
-0051 scrap selling (hibidohot) ; proposed stripping procedure
copy -0070 (M781) " (poor crane operator)
/10 copy "Hg mining"
-0271 labor statistics
-0006 L-5 strip progress reports, no. 2 - 6-30-65 ← 12-30-65
total cost
salvage sales
property transfers (book value)
-0181 scrap selling
-0194 costs analyses
copy -0246/35 Same [6/4/65 letter on progress started on 3/29/65]
copy -0274/9 ↓
→ " /12 stop in summer

(3157 to 7/62) ← ref'd to July 62 Y4LY report

81-10 docs:

M-68
"

0057 1971-82
0174 1956-59
0215 1971-73
0418 " 1953
have ~~0449~~ 1959

Solvent/recovery:

~~M-65~~

0005 ~~4/57-5/62~~
0007 ? ~~5559~~
16 KT-542 1960
23
413,414 "chem. recovery 1953
440,441 β-4 ↑ 1953
~~442 chem recovery 1954~~

→ burner: 0169
0172

not pulled yet

1959-1965, esp. 62
α-5 shutdown

~~Alpha-5~~ Alpha-5:
0160
0024 H_2SO_4 H_2O tint.
0057 strip
0070
0271

9201-5: 0006
0181
0194
0246
0274

4Q 1962
α-4 shutdown

Alpha-4:
0024
0053 losses ~~H_2~~ (Sump)
0275
0276
0277
0482 date?

→ ~~A5~~:

Copy:
0005
M-0023
0059?

MISC
0050 EMCR = (?) 1983

α4, α2:
0526 α5 ventilation drawings
0528 dates = ? 1955

cone's set by location
no. of samples in a cone. range set by .1-.2, .2-.3...
0503 α5 corresp.

copy p.2, #4

α-2 (and 9202)

3-15-95
20

copy (M835) -0082 — 1/54 - 8/54 weekly report w hi-lo-avg

copy2 2 cop (M459) -0183 — 11-18-70 ~~[illegible]~~ survey basement! (0.1 hi)

copy #4,5 (M736) -0241 — #3 4-4-72 survey basement + 1st floor (.04 hi)

" — #5 3-22-76 dirt basement survey (.03 hi)

copy -0314 — 12-13-57 α-2 inventory

α-2 strip = ?

Copy of letter routed
from R. A. Walker's office
6/15/59

Ellis (1)
alker (1)
File (1)

Y/HG-0007/6

AFI:JJA

Oak Ridge, Tennessee
June 5, 1959

Union Carbide Nuclear Company
Post Office Box P
Oak Ridge, Tennessee

Attention: Mr. C. E. Center, Vice President

Subject: SOLVENT USED IN PILOT PLANT, BUILDING 9201-2

Gentlemen:

Reference is made to your letter of May 26, 1959, symbol CEC/JSM/mbr, on the above subject, in which you requested approval of a prior year cost adjustment for $337,108.16 covering loss of solvent in the pilot plant process.

Since this material was capitalized as plant and equipment, the loss incurred would be more appropriate as a charge to Activity 10489, Other Cost - Non-Fund - Miscellaneous, within the definition stated in AEC Appendix 1103-03-K of the AEC Manual. We shall appreciate your treating this transaction accordingly.

Very truly yours,

for S. R. Sapirie
Manager
Oak Ridge Operations

CC: Ray C. Armstrong, Assistant Manager for Operations

COPY

MCT solvent
1955-1959

Y/HG-000/Subnumber

7/1 Solvent recovery from cooling towers. Letter: Grooms to Kite, July 19, 1955. 1p.

7/2 Notes: estimated inventory of MCT facilities as of June 30, 1955. 1p.

7/3 Miscellaneous solvent recovery. Letter: Grooms to Kite, Sept. 14, 1955. 1p.

7/4 Miscellaneous solvent recovered and loaned. Letter: Grooms to Kite, October 4, 1955. 1p.

7/5 Miscellaneous solvent recovered and loaned. Letter: Grooms to Kite, November 2, 1955. 1p.

7/6 Solvent used in pilot plant, Building 9201-2. Letter: Sapirie to Center, June 5, 1959. 1p.

3/16 looked at 40 copied 26

~~[TITLE]~~ [KYWRDS] [ABSTRCT] [REMBR] [TITLE] [AUTHORS] [ISSUED]

M-65, 68, 810 (81-10) (β-4)

M files

(air)	(H2O)
14-12-12	19-7-6
20-9-19	18-10-4

M-827, M-834

[β-4] (17)

- 0113 additional ventilation 1954 / -0332? 1954 N2? / -0435 vent gas filter tests 1954
- 0201 Shutdown corresp. 1956, 57
- 0338 expansion 1953
- 0504 corresp. 1953, 54
- ~~0418?~~ ~~0440~~ ~~0441~~ ~~0442~~
- 0049 monthly air from M-834 late 1954
- 0080 HP Reports 1954 from M-827
- 0081 weekly air 1954 from M-834
- 0133 solvent loss - tray vent 1953
- 0173 stacks 1953
- 0200 ops? 1953-55
- 0328 ADP vez? 1953
- 0335 new pumps 1953
- 0453 solvent? 1953
- 0454?

~~Bets~~ ~~β-4, β-4~~ ~~9204-4~~

L-2

- 0082 L-2 and 9202 weekly solvent reports
- 0183 1970's
- 0241 "
- 0314 1957 inventory

~~9203~~

β-4

3-15-95
1 of

(M601)
copy Y/HG-113 plan for β-4 vent changes; 7-15-54; no air data (at some pts.) (2X the MAC); +500K cfm

(M601)
-332 N_2 instead of Air saved $2K

(M797)
-435 vent gas filters (hydrogen); 1-3% then ↑ to lower explosive limit; samples analyzed Fonsalloy; air flow thru tray = 1.5-2 cfm; Hg mentioned

(M603)
-201 1956-57 stripping: correspondance #1 allowable P drop from 0.5-1.0 in. H_2O in air filters
mostly budget - sect. changes, cost estimates
#4 ETU? project in 9201-3
#7 8/1/56 stripping proposal
plant mgr = J.P. Murray
#13 2 months to strip (plan)
#17 Oak Ridge Processing Co.

(M601)
-504 [redacted] correspondance: #3 LiOH from $LiSO_4$ recovery
#5 N_2 used to machine, crush, and pulverizing ops in the β-4 Aspen "P" area 7/16/54 β-4 9204-2 helium, argon
#6 17" 8" diam. rubber (latex) bags

copy req's drawings (M810)
-418 drawings missing - can request from Engrng.

copy (M834)
-049 ← 9/54 to 1/55 monthly solvent air data β-4

(M827)
-080 extra copy ?

copy (M-834)
-081 ← 6 mo. of β-4 air data in weekly solvent reports 1/54 to 8/54

copy (M798)
-133 ← tray vent system solvent loss β-4

copy 1 pg.? (M836)
-173 ← 10/53 air conc. in stacks β-4 North Plant? South Plant?

(M601)
-200 #10 HCl spec.
storm sewer ↑
#12, 15, 20 cooling H_2O towers for tray cooling H_2O heat exchangers in tray cooling syste
#18 need all the vent'ln they can get

-328 β-4 → exclusion zone

-335 pumps for makeup H_2O

copy pg (M601)
-338 β-4 expansion so presently installed "an acid wash system (to be purchased)" "install dupl. system"

" (M195)
-453 total of ($61,241,224) 1,246,204 of solvent was put into the system of the β-4 plant
as of 10-1-53

copy pg. (M195)
-454 1,167 bottles / 88,692 11-1-53
telephone report of solvent in 9204-4

RESTRICTED

INTER-CO[illegible] FORM

RESPONDENCE

INSERT NAME) COMPANY CARBIDE AND [illegible]

UN[illegible]

COMPANY LOCATION Post Office Box P OAK RIDGE, TENN.

TO G. A. Strayser

LOCATION

ATTENTION

COPY TO W. K. Whitson, Jr.
J. W. Ebert
J. W. Strohecker
L. P. Twichell
File

DATE September 17, 1953

REFERENCE LETTER DATE M-601

SUBJECT Summary of Changes in Auxiliary Systems for Beta-4 Expansion

Y/HG-0338

Verified by [signature] (Signature of person making change) 9-17-94 (Date)

by authority of [illegible] (Authority for change in classification) 9-12-94 (Date)

Classification changed to [illegible] (Insert appropriate classification level and category)

APPROVED FOR PUBLIC RELEASE Technical Information Office Date 12/16/94

100 System

1. Add 5,000 gal. R.L. make up process water storage tank.

200 System

1. Add evaporator product coder in parallel with present cooler.
2. Add 5,000 gal. R. L. spent raffinate storage tank in present location of Niagara filter on second floor. Move Niagara filter southeast of present location.
3. Add 10,000 or 20,000 gal. carbon steel tank for emergency evaporator product storage. This tank to be located outside the building, North of the evaporator. It will be supplied by Carbide from surplus.

DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW
Document No. [illegible]
1. Classification Retained
2. Classification Changed To: U
3. Contains No DOE Classified Information
4. Classification Cancelled
5. Classified Information Deleted
6. Other (Specify)
Author: [illegible] Date: 9/16/94
Author: [illegible] Date: 9/16/94

MMES QA
Y-12 Classification Office
Name: A. S. Mason
Date: 11-11-94

300 System

1. Add one 500 gal. R. L. dissolver.
2. Add one 1,000 gal. R. L. purified feed storage tank without agitator.

400 System

Install duplicate solvent purification system in area presently occupied by extract system. This purification system will consist of the following:

C. E. Jasny

Trak

1. Five 300 gal. C. S. storage tanks (to be purchased).
2. A new 300 gal. C. S. head tank (to be purchased) complete with supply, discharge and overflow piping. No instrumentation is to be used in the discharge piping. The head tank will be located two or three feet higher than the existing head tank as required for proper control in the

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UNCLASSIFIED

solvent distribution system at 7 liters/min./line flow.

3. An acid wash system consisting of tower, tank and pumps as presently installed (to be purchased).

4. A water wash system similar to the second water wash system presently installed. The equipment presently used in the existing first water wash system will be removed and used for this purpose. The only items missing will be two 25 hp motors presently on order as spares.

500 System

A new 500 system will be installed outside the building at the west end. It will consist of the following:

1. Two 8 gpm C. S. salting evaporators.

2. A 5,000 gal. R. L. evaporator feed storage tank.

3. Four 30" Tolhurst Monel centrifuges (two new ones to be purchased).

600 System

No change.

700 System

No change.

800 System

No change.

G. R. Jasny

GRJ:ak

OAK RIDGE Y-12 PLANT INFORMATION CONTROL FORM

DOCUMENT DESCRIPTION (Completed By Requesting Division)

Document No.	Author's Telephone No.	Acct. No.	Date of Request
Y/HG-0268/DEL REV	6-0263	2366000 3	5/22/95

Unclassified Title: MERCURY FLASKING SYNOPSIS MEMO (M-322)
1977 2-4

Author(s): Requestor: Steve Wiley

TYPE: ☐ Formal Report ☐ Informal Report ☐ Progress/Status Report ☐ Co-Op Report

☐ Oral Presentation (identify meeting, sponsor, location, date):

☐ Journal Article (Identify Journal):

☒ Other (Specify): To Be Released to ChemRisk, Phase II

Flasking per 1977 A-H

Document will be published in proceedings ☑ No ☐ Yes

Document will be distributed at meeting ☑ No ☐ Yes

Document has patent or invention significance ☐ No ☐ Yes (Identify)

Document has been previously released ☑ No ☐ Yes (Reference)

DIVISION REVIEW AND APPROVAL (Completed By Requesting Division)

TECHNICAL CLASSIFICATION REVIEW (Divisional Classification Representative)

Title(s): U Abstract: NA

DOCUMENT: Level C Category RD

R Rosum 5-24-95
Signature Date

BRACKETED FOR DECLASS

DOCUMENT REQUEST APPROVED (Division or Department)

Steve Wiley 5/22/95
Signature Date

Signature Date

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Date Received: _____ Date Initiated: 5/23/95

☐ Editor Date

☒ 3 Waived / P. McKenney Patent Office Date

☐ _____ Date

☐ _____ Date

☑ CLASSIFICATIONS:

Title(s): U Abstract N/A

DOCUMENT:

Level U (w/Dd.) Category -

Weapons Data - Sigma -

R K Fraser 5/26/95
Y-12 Classification Office Date

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P.R. McKenney 5/31/95
Technical Information Office Date

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D 15

INTERNAL CORRESPONDENCE

NUCLEAR DIVISION

POST OFFICE BOX Y, OAK RIDGE, TENNESSEE 37830

~~Y/HG-0268~~
Y/HG-0268/DEL REV

To (Name) D. J. Bostock (2)
Division
Location Building 9212, MS 2

Date September 25, 1978

Originating Dept. Processing and Forming Operations

Answering letter date

Subject Mercury Flasking Synopsis (U)

Copy to T. H. Ebert
M. S. Grim
V. B. Gritzner
J. M. Napier
File (NoRC)

Attached is a copy of the Synopsis of the Mercury Flasking Operations. The major historical references listed in the last section of the Synopsis are also attached for your files and future reference.

J. S. Anderson
J. S. Anderson

JSA:ssa

Attachments

APPROVED FOR PUBLIC RELEASE
P. L. McKenney 5/31/95
Technical Information Office Date

Document transmitted herewith contains RESTRICTED DATA.

handle as UNCLASSIFIED.

DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW

~~CONFIDENTIAL~~

Anderson 1978 not in repos.

9/25/78
J. S. Anderson

MERCURY FLASKING SYNOPSIS

Preparations were started in the spring of 1976 to flask several million pounds of mercury that were contained in the columns and process equipment located in Building 9201-4 of the Oak Ridge Y-12 Plant.

A great deal of equipment reactivation and modifications was made before the actual flasking began. A second flasking station was installed, and the existing station was upgraded and equipped to automatically fill each flask to the required quantity. A new ventilation system was installed to exhaust each hood. Floor drains and other piping modifications were made to prevent any mercury loss. The building vacuum system was restored to full capacity by the replacement of the second vacuum pump. Safety showers, eye wash stations, fresh air stations, building exhaust fans, and restroom facilities were activated at critical locations throughout the building. A mercury transfer line from the east side of the building to the west side was installed; and critical mercury transfer pumps were removed, rebuilt, and reinstalled. Storage tanks were cleaned, inspected, and prepared for use. A water treatment facility was installed to treat mercury contaminated water prior to disposal. Interim mercury storage areas were provided in Building 9201-4, and a permanent storage area was prepared in Building 9720-26.

In addition to equipment modifications and reactivation, a great deal of planning and organization was performed. A specification for the new flasks was prepared and a purchase order awarded to Norris Industries in Los Angeles, California. Mercury Flasking Procedure 50-37-35-001 was prepared. Column Washing, Water Treatment, and Mercury Butter Cleaning Procedure 50-37-35-002 was prepared. Health and Safety Training Instruction for Mercury Operations was prepared, and each employee was trained. Detailed Safety Analysis Reports were prepared for the Flasking and Washing Operations, and were approved by a DOE committee from the ORO Safety and Environmental Control Division. The committee also made a pre-operational tour of the facility.

Actual flasking of the mercury was started in January, 1977 and completed in December, 1977. [flasks, representating[pounds of mercury, were filled.] This total was 276,946 pounds more than was charged to the building inventory. An additional estimated 8,000 pounds of mercury was left in one of the pit flasking tanks, below the pump level, since future stripping operations will generate additional mercury that will be collected in the same tank.

After the columns were emptied, they were filled with water and vibrated to dislodge any residual mercury adhering to the packing rings inside the column. The bulk mercury was flasked; and the mercury contaminated water was chemically treated, filtered, and sampled prior to disposal.

[redacted]

[redacted] contains Restricted Data as defined [redacted] unauthorized [redacted] prohibited.

The job was completed with no serious air count problems or incidents. The urinalysis results of one process operator exceeded the Y-12 Plant action limit. The operator was removed from the operations.

The flasking and washing operations were accomplished at a total cost of $115,041 less than the $2,700,000 budgeted.

Major Cost Breakdown

Total Charges to B-00980-00		$2,584,959
Breakdown:		
Flasks Purchased	$1,728,478	
Department 2619 Direct Labor	280,504	
Rust Construction, Y-12 Engineering, Maintenance, and Other Support	575,977	
	$2,584,959	
Total DOE Budget for B-00980-00		$2,700,000
Less Charges		$2,584,959
Total Not Spent		$ 115,041

Historical References

Safety Analysis Report on Mercury Flasking, Y/MA-5556, November 1976.

Safety Analysis Report on Mercury Flasking - Phase II Column Washing, Water Treatment, and Mercury Butter Cleaning, Y/MA-5556 - Addendum I, December 1977.

Mercury Flasking Procedure 50-37-35-001. 1/

Health and Safety Training Instruction for Mercury Operations. 1/

Column Washing, Water Treatment, and Mercury Butter Cleaning Procedure 50-37-35-002. 2/

Mercury Flasks Purchase Requisition, Y-12 30Y-07726V, Change Notice G.

Engineering Work Order S-02055, Mercury Flasking, 9201-4.

Engineering Work Order S-02059, Waste Water Treatment Experiment, 9201-4.

1/ Included in Y/MA-5556.

2/ Included in Y/MA-5556 - Addendum I.

UNION CARBIDE

INTERNAL CORRESPONDENCE

NUCLEAR DIVISION

POST OFFICE BOX Y, OAK RIDGE, TENNESSEE 37830

To (Name) J. M. Napier
Division
Location Building 9202 — MS 1

Date September 8, 1977
Originating Dept. Process Analysis
Answering letter date

Copy to D. J. Bostock ✓ V. B. Gritzner
J. T. Bradbury D. W. Smith
N. Dow R. D. Williams
T. H. Ebert ✓ File (RC)

Subject Mercury Bottle Filling Overage

A random sample of 77 bottles of mercury were weighed to ascertain the extent to which bottles had been overfilled, i.e., the extent to which the amount of mercury exceeded the nominal amount of 76 lbs per bottle. This sample represented a population of 155,009 bottles of mercury which were filled using the same procedures as were used for the bottles in the sample.* Of the 77 bottles in the sample, 76 bottles were found to have sufficient capacity to hold at least 76 lbs of mercury.

Attached is a histogram of the overages in terms of ounces over 76 lbs in these 76 bottles. The mean of the very skewed distribution is 4.816 oz. If we apply this mean to the entire population of 155,009 bottles, we have a population overage of 46,658 lbs.

The 77th bottle in the sample had capacity to hold no more than 74 lbs 11 oz. Since we have been reusing the bottles in which the mercury was originally received in the rebottling program, it is clear we received 74 lbs 11 oz or less in this bottle. In a sample of 77 bottles, we have found one such bottle. The 95% confidence limits on this number are from 0 to 3 such bottles (inclusive) in samples of 77 bottles from this population.

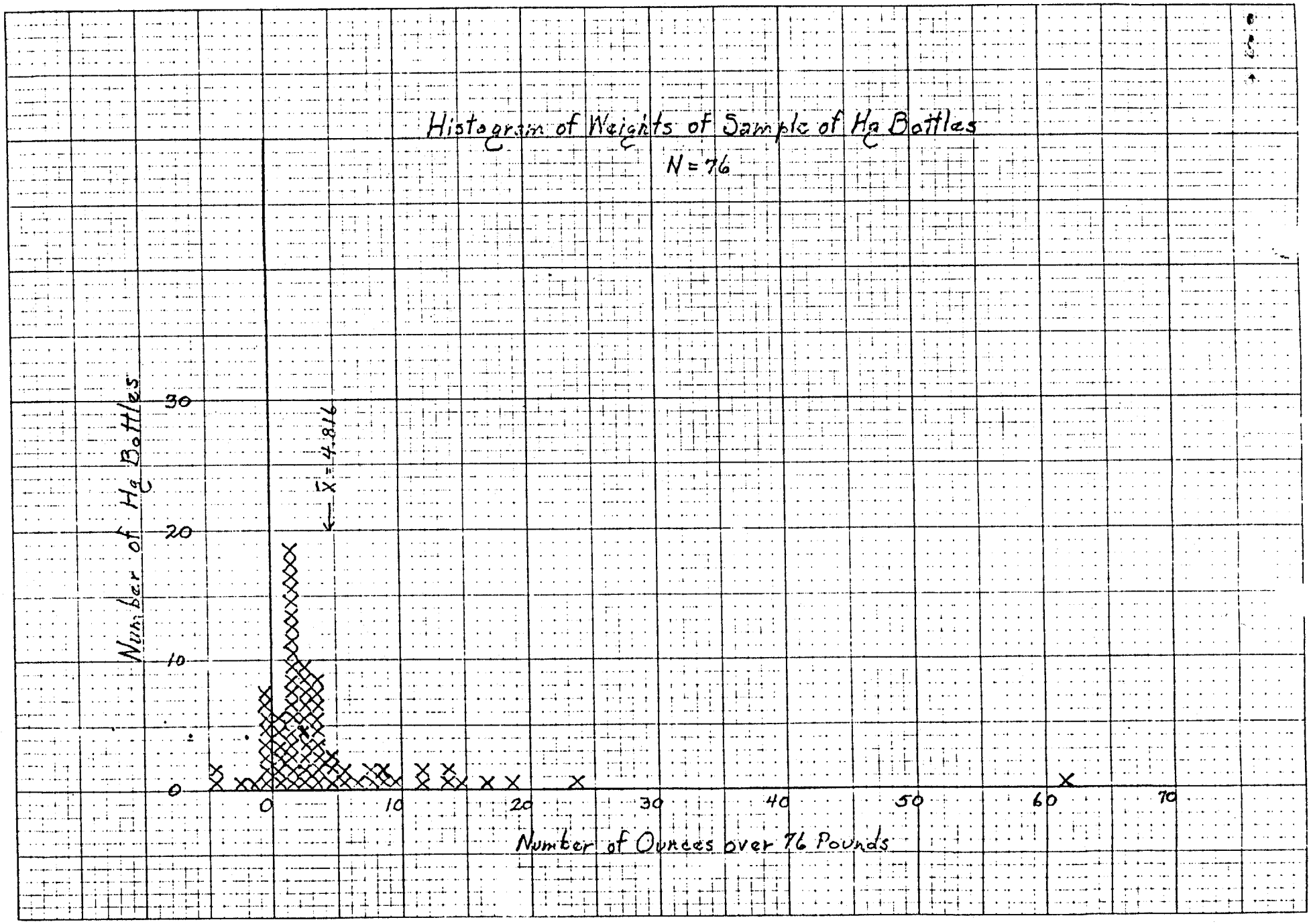
R. D. Smith

R. D. Smith

RDS:mdh

Attachment

* Per D. W. Smith, Metal Preparation.



UCN-7721B
(2 8/96)

11/14

OAK RIDGE Y-12 PLANT INFORMATION CONTROL FORM ChemRisk

DOCUMENT DESCRIPTION (Completed by Requesting Division)

Document No.	Date of Request	Requested Date of Release (Allow 5 to 10 Days)	Page Count
Y/MA-6556	11-07-96		34

Unclassified Title: SAFETY ANALYSIS REPORT ON MERCURY FLASKING

Author's / Requestor's Name	Telephone No., Pager No. and Plant Address	Account Number
J. S ANDERSEN / S. W. Wiley	6-0263, 417-5417, Bldg. 9106, MS-8023	2366-0003

INTENDED AUDIENCE: ☐ Public ☐ Environmental Regulators ☐ NWC ☐ DOE Contractors ☒ Other ChemRisk

TYPE: ☐ Abstract ☐ Brochure ☐ Co-op Report ☐ Formal Report ☐ Informal Report
☐ Invention Disclosure ☐ Journal Article ☐ News Release ☐ Photograph/Visuals ☐ Technical Progress Report
☐ Thesis/Term Paper ☐ Videotape ☐ Other
☐ Oral Presentation (identify meeting, sponsor, location, date):

PATENT OR INVENTION SIGNIFICANCE ☐ Yes ☐ No (Identify) Document will be published in proceedings ☐ Yes ☐ No
Document has been previously released ☐ Yes ☐ No (Reference) Document will be distributed at meeting ☐ Yes ☐ No

This document contains unclassified controlled information. ☐ YES ☐ NO [If yes, please identify the category(s) by checking the applicable space(s) below.]

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DIVISION REVIEW AND APPROVAL (Completed by Requesting Division)

CLASSIFICATION REVIEW [Authorized Derivative Classifier (ADC)]

Classification of: Title: UNC Abstract: NA

DOCUMENT: Level UNC Category NA

S. W. Wiley (Print Name) — Signature — 11-07-96 (Date)

DOCUMENT REQUEST APPROVED (Division/Department Mgr.)

S. W. Wiley TOA/HS Coordinator
Please Print Name and Title

Signature — 11-07-96 (Date)

APPROVAL AND RELEASE (Completed by the Classification/Technical Information Control Office)

CLASSIFICATION OFFICE:

Title: U Abstract: NA

DOCUMENT: Level U Category –

Weapons Data – Sigma –

Y-12 Classification Office — 11/12/96 (Date)

☐ Waived / P. McKenney — Patent Office — 11/11/96 (Date)
☐ ____ Date
☐ ____ Date
☐ ____ Date

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☐ SPECIAL LIMITED
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Conditions/Remarks:

Request Approved

P. L. McKenney — Y-12 Technical Information Office — 11/12/96 (Date)

Date of Issue: December 6, 1976

Report Number: Y/MA-5556

not in repos
Anderson 1976

SAFETY ANALYSIS REPORT ON MERCURY FLASKING

J. S. Anderson

Processing and Forming Operations
Metal Preparation Division

Oak Ridge Y-12 Plant
P. O. Box Y, Oak Ridge, Tennessee 37830

Prepared for the US Energy Research
and Development Administration
Under US Government Contract W-7405-eng-26

CONTENTS

SAFETY ANALYSIS REPORT ON MERCURY FLASKING

INTRODUCTION

Several million pounds of mercury are contained in the columns, several storage tanks, and other process equipment currently in excess status and located in Building 9201-4 of the Oak Ridge Y-12 Plant.(a) This mercury is to be removed and flasked in new storage flasks and crates in a manner acceptable to the Energy Research and Development Administration and the General Services Administration.

Removal of the mercury from the equipment in Building 9201-4 will be accomplished in three phases. Phase I will cover the removal and flasking of bulk mercury that is contained in the columns and various storage tanks. Phase II will cover the flushing of equipment with water after the bulk mercury has been removed and flasked, and treatment of the wash water prior to discarding. Phase III will cover the actual stripping and disposal of equipment from the building when the funding is made available.

This report considers only Phase I. Addendums concerning Phases II and III will be issued at later dates when details of these operations have been determined.

OBJECTIVE OF THE REPORT

The objective of this Safety Analysis Report is to point out and discuss safety-related aspects and considerations pertaining to the Flasking Operation. Environmental and quality assurance considerations are also included.

DESCRIPTION OF THE FACILITY

Building 9201-4 is presently the excess facility for the Lithium Isotope Separation Process and is located along the south side of First Street between G and H Roads. The building has three main floors, with two high bay areas (approximately 62 feet above the second-floor level) located east and west of the two-story center section. The building contains 615,900 square feet of floor area. It is framed with steel and concrete, and has corrugated Transite walls. Partitions are made of hollow masonry tiles. The floors and ceilings are of reinforced concrete, except for the drop ceilings which are of fiberboard. The roof is of concrete covered with felt, tar, and gravel. The roof may be reached in the northeast and southwest corners of the building at stairways at Columns 11C and 19L.

PROCESS DESCRIPTION

Process Equipment Containing Mercury

The bulk of the mercury is stored in the process columns of Building 9201-4. The remainder of the mercury is contained in various storage tanks, process equipment, and process lines located throughout the entire building.

(a) Operated by the Union Carbide Corporation's Nuclear Division for the US Energy Research and Development Administration.

Method of Flasking

Before any mercury transfer is made, the supervisor in charge will check the levels of the columns or tanks, piping, valves, and any pumps involved. The assigned process operator(s) will initiate the transfer of mercury only under the direction of the supervisor in charge.

The mercury located in the columns, storage tanks, and process equipment in the east crane bay will be transferred to the east crane bay pit dump tanks (F-1 and F-2). The mercury will then be pumped from these dump tanks through a newly installed transfer line to the west pit dump tanks (F-3 or F-4) from which all flasking will be done. The mercury located in the columns, storage tanks, and process equipment in the west crane bay will be transferred directly to the west pit dump tanks (F-3 or F-4).

Prior to pumping mercury from F-3 or F-4 to the storage tank (F-1451) for flasking, a quality-control sample of mercury will be taken and analyzed. When filled to the operating level, Tank F-1451 will constitute a batch of mercury. Approximately seven lots, containing eleven filled pallets each, are contained in each batch. Each pallet contains 45 flasks; therefore, approximately 3465 flasks can be filled from each batch. This number may vary as operating conditions dictate.

A certification sample will be taken from the first and last crates that are flasked from a batch and correlated with each lot flasked from that batch.

From Tank F-1451, the mercury is pumped continuously up to a small (30-gal) head tank which overflows back to Tank F-1451. The mercury flows by gravity from the 30-gallon head tank over to the two flasking stations where the mercury will be flasked in new flasks purchased in accordance with "UCC-ND Equipment Specification YS-2842" (see Appendix A).

After flasking, a total of 45 flasks will be placed in new wooden box pallets designed as per "Hardwood Box Pallet Specification for Mercury Flasks, GSA, 1962" (see Appendix B). The pallets were purchased from the vendor on the same requisition as the flasks to serve as shipping containers for the new flasks.

The filled pallets will be identified, inventoried, and stored in a Y-12 warehouse (Building 9720-26) which is provided with a collection system to contain any leakage. All cracks in the floor and the surfaces of the drainage sumps will be sealed.

More details of the general discussion of the method of flasking and a flow diagram can be found in the "Alpha-5 Processing Department Casting and Forming Operations Mercury Flasking Procedure, 50-37-35-001" (see Appendix C).

Worst Possible Incident

The worst possible incident would probably consist of the unplanned spilling of the entire contents of a column at one particular time. The chances of this happening are remote; however, the pits located in both the east and west crane bays are designed to contain the contents of an entire column. The surfaces of these pits are also sealed with epoxy to prevent any seepage of mercury.

Abnormal Conditions and Personnel Training

Major abnormal conditions are not anticipated; however, supervision and the process operators will be thoroughly trained in all phases of the flasking operation, including the proposed work and job assignments, the potential hazards, and the protective measures to be used. The training material is documented in the "Health and Safety Training Instructions for Mercury Operations" (Appendix D).

HEALTH AND SAFETY CONSIDERATIONS

Mercury Hazards

Toxicity - Mercury and its compounds may be absorbed through the skin, the gastrointestinal tract, and the lungs. The principal hazard is by inhalation, but skin absorption must be taken into consideration when evaluating the overall hazard. The adverse effects of mercury absorption have been investigated by many researchers and are well documented.

Acute poisoning has the symptoms of tightness in the chest, difficulty in breathing, coughing, and pain in the chest. In chronic poisoning, psychic and emotional disturbances are characteristic: fine tremors may affect the hands, head, lips, tongue, or jaw. Other signs of systemic poisoning occur with less regularity, but salivation, gingivitis, and digestive disturbances are common; stomatitis is sometimes severe.

Threshold limit values (TLV) refer to airborne concentrations of substances and represent conditions under which it is believed that nearly all workers may be repeatedly exposed day after day without an adverse effect. Threshold limit values represent time-weighted averages (TWA) for an 8-hour workday and a 40-hour workweek. Time-weighted averages permit excursions above the limit, provided they are compensated for by equivalent excursions below the limit during the workday. The degree of permissible excursion is related to the TLV for a particular substance. The TLV for mercury is 0.05 mg/m^3, with permissible excursions to 0.15 mg/m^3 for short periods of time. However, the number of times the excursion above the TLV is permitted will be governed by the TWA.

Any water solutions being discharged to the environment will meet the appropriate pollution standards.

Fire and Explosion - Mercury itself does not support combustion. The control of combustible materials located near quantities of mercury will be maintained, however, due to increased vaporization of toxic mercury should a fire occur.

Electrical Conductivity - Mercury conducts an electrical current. Should any mercury be spilled on live electrical equipment, the power source will be disconnected prior to clean up.

Equipment Hazards

Pits - Entry into the two dump pits located on the first floor of the east and west crane bays will be controlled by requirements set forth in Health and Safety Procedure 70-750 "Confined Space Entry".

Tank Entry and Inspection - Tank entry will be controlled by requirements set forth in Health and Safety Procedure 70-750 "Confined Space Entry". Tank inspections not requiring entry will be controlled by requirements of the Industrial Hygiene Department.

Personnel Protection

Safety Equipment - Each employee subject to mercury contact will be supplied with safety shoes and a daily change of Company clothing. Should the clothing become contaminated with mercury, the employee will be required to shower and change clothing. Monogoggles, face shields, hard hats, gloves, and other protective equipment will be provided on an as-needed basis, as determined by guidance from the Plant Safety Department. Safety glasses will be worn routinely. Contaminated clothing and equipment will be segregated and stored until a proper disposal method is developed.

Respiratory Equipment - Personnel required to wear respiratory protective devices shall be custom fitted in the Respirator Testing Facility prior to wearing respirators.

Respirators shall be worn anytime the atmospheric concentration of mercury in the work area exceeds the TWA of 0.05 mg/m^3. Table 1 shall be used in determining the type of respirator to be used.

Ventilation - Existing building ventilation will be operated to maintain mercury concentrations below the TWA of 0.05 mg/m^3, as determined by the Industrial Hygiene Department. Respirators will be worn if this level is exceeded.

A new exhaust fan and duct work with a local warning device to warn of ventilation loss will be installed to provide exhaust to the existing and the new flasking stations.

Two new steam unit heaters will be located at the flasking stations to provide spot heating for personnel comfort during the winter months.

Housekeeping - The best method of controlling mercury hazards is to eliminate the source—exposed mercury. All efforts will be exercised in the flasking and transferring operations to prevent mercury spills. Should a spill occur, it will be cleaned up immediately.

Personal Hygiene - Several precautions will be stressed to personnel working with mercury, namely:

1. *Eating and Smoking* - The entry of mercury into the body via contaminated food and/or the smoking of contaminated tobacco is a very real problem with a high potential danger. Therefore, eating and/or smoking in

Table 1

REQUIRED RESPIRATOR USAGE AT ELEVATED MERCURY CONCENTRATIONS

Mercury Concentrations (mg/m^3)	Respirator Type (1)
< 0.05	None. (This limit allows for excursions to 0.15 mg/m^3 for short periods, but the TWA must not be exceeded.)
> 0.05 - < 0.25	I, II, III, IV
> 0.25 - < 5.0	II, III, IV
> 5.0	III, IV

(1) I - Half-face respirator with iodine-impregnated charcoal filter cartridge (Mersorb).

II - Full face mask; iodine-impregnated charcoal-filled canister (Mersorb).

III - Type C positive-supplied air respirator.

IV - Self-contained breathing apparatus.

the area of the bottling operation and the surrounding work areas shall be strictly forbidden. Personnel working in the area will be required to retire to an area which is uncontaminated prior to eating or smoking. In addition, personal hygiene will be stressed with personnel being educated in the need for thorough washing of hands prior to eating or smoking.

2. *Showers* - All personnel directly involved in the mercury flasking operation shall be required to shower daily at the end of the workshift. This requirement is intended to minimize the possible transfer of mercury contamination to personal effects or the individual's home. Personnel shall be informed that thorough washing, including the hair, is necessary in order to maximize the effects of this requirement.

Industrial Hygiene Monitoring Program - Specific monitoring programs will be conducted by Industrial Hygiene, namely;

1. *Operating Area Air* - No less than twice daily, technicians under the direction of the Industrial Hygiene Group will perform a walk-through survey of the flasking operation. At this time, the concentration of mercury vapor in the air will be monitored using a direct-reading mercury vapor detector, with the results being recorded at the time of the survey. This method of monitoring the mercury vapor concentration is intended to assist in evaluating the need for respiratory protection; and, should the need arise, the type of respiratory protection required to protect personnel from overexposure to mercury vapor will be announced.

2. *Personal Samplers* - Personal samplers, designed to determine the actual exposure of workers to mercury vapor, will be used daily in order to determine the TWA exposure to mercury vapor for personnel performing various jobs. These samplers will consist of a sampling pump and an iodine-impregnated charcoal tube that absorbs mercury.

3. *Mercury Urinalysis Program* - All personnel involved in the mercury flasking operation, as well as those persons visiting the area on a regular basis, shall be required to participate in the Mercury Urinalysis Program. Urine samples will be collected weekly from those persons determined as having high potential for exposure to mercury. Personnel who exhibit high urinary mercury concentration (≥ 0.30 μg/ml) will be excluded from the work area until their urinary mercury concentration returns to a safe level. In addition, those job operations in which the personnel involved, or personnel who show a continuously high urinary mercury concentration (≥ 0.30 μg/ml), will require an in-depth study to determine the source of the exposure.

4. *Mercury X-Check Program* - Those personnel who are determined as having a high potential for overexposure to mercury will be required to participate in the Mercury X-Check Program. This program requires that personnel report to the Y-12 Health Center on a quarterly basis for special urinalysis studies designed to detect any effects due, possibly, to mercury exposure.

5. *Safety Department Program Evaluation and Audits* - The Safety Department will conduct an overall appraisal of the flasking operation from a health and safety standpoint. Periodic health and safety audits will be made throughout the operation.

ENVIRONMENTAL ASSESSMENT

Environmental Statement

While removing mercury from the process equipment in Building 9201-4:

1. The mercury is to be flasked in a manner acceptable to ERDA and GSA, and the storage consistent with EPA regulations. Adequate action plans should assure that there will be no adverse effect on the environment, either on site or off site.
2. The operation will be performed so as to meet all appropriate standards for both the environment and personnel.
3. Due to the nature, scale, and location of the proposed project, no primary or secondary consequences on the environment are anticipated.
4. No alternatives are planned since the initial plan is to satisfy any effects on the environment.
5. Because of the nature of the plan, no adverse effects are expected on the environment.
6. There are no proposed trade offs between short-term environmental gains at the expense of term losses, or vice versa. Plans are to conclude operations if adverse effects on personnel and/or environment are indicated.
7. Any indication of loss or destruction by the action will be reason enough for cessation of the operation for corrective measures.
8. Since plans are not to affect the environment, no reasonable alternatives are considered justified.

Health Physics Monitoring Program

The Health Physics Department will monitor discharges to the environment to assure that all appropriate pollution standards are being met.

QUALITY ASSURANCE ASPECTS

Definite actions will be observed that pertain to the quality assurance aspects of the program:

1. All mercury to be flasked will be batched, sampled, flasked, identified, inventoried, stored, and monitored to meet specifications of the National Stockpile Purchase Specifications for Mercury (P-31-R2).
2. All personnel involved with the flasking operation will receive extensive training prior to their work assignment.
3. A formal safety meeting will be held each month that will include a discussion of existing and potential safety and industrial hygiene hazards. Safety discussions will be held as necessary to ensure safety consciousness in all personnel.
4. Guidance and recommendations from the Safety, Industrial Hygiene, and Health Physics Departments will be requested throughout the flasking operation.
5. Guidance and recommendation from Engineering, Maintenance, and other Plant groups will be requested as needed throughout the flasking operation.

APPENDIX C

MERCURY FLASKING PROCEDURE 50-37-35-001

MERCURY FLASKING PROCEDURE 50-37-35-001

ALPHA-5 PROCESSING DEPARTMENT
CASTING AND FORMING OPERATIONS
MERCURY FLASKING PROCEDURE 50-37-35-001

1.0 PURPOSE

To provide a standard operating procedure for the transfer, flasking, and handling of mercury in Building 9201-4.

2.0 SCOPE

Defines the duties and responsibilities and outlines the operations involved in transferring mercury from its present storage facilities in Building 9201-4 to standard flasks, palleted for storage and/or shipment.

3.0 DEFINITIONS

3.1 Flask - A three (3) liter steel container sized to hold seventy-six (76) pounds of mercury, with a threaded plug for sealing the openings, GSA approved UCC-ND Specification YS-2842, SK-M-1000.

3.2 Pallet - A wooden container constructed per GSA Hardwood Box Pallet Specifications (1962) designed for forty-five (45) flasks.

3.3 Lot - A group of eleven (11) full pallets.

3.4 Sample Batch - Approximately seven (7) lots of pallets (Def. 3.3) flasked from the same storage tank full of mercury and represented by a certification

4.0 REFERENCES

None

5.0 RESPONSIBILITIES

5.1 Area Supervisor

5.1.1 Assigns personnel to the various work areas.

5.1.2 Provides for the necessary training and instructions.

5.1.3 Provides liaison with other groups associated or involved in the mercury flasking operation.

5.2 Line Supervisor

5.2.1 Assigns, instructs, and supervises process operators in specific duties and activities.

5.2.2 Insures that all Industrial Hygiene health and safety standards and recommendations are met, and all personnel monitoring programs are followed.

5.2.3 Insures that all equipment is correctly maintained, and all instrument calibrations are current.

5.2.4 Examines and verifies all records of the operations and activities.

5.3 Process Operator

5.3.1 Performs assigned duties according to standard operating procedures and supervisors instructions.

5.3.2 Maintains all logs and records necessary to document the work performed.

5.3.3 Reports any deviations of equipment, materials or operations from the specified or expected conditions.

6.0 OPERATIONS

6.1 Health and Safety Considerations

The details of protecting personnel and the Industrial Hygiene hazards of handling mercury, and the safety factors of this work are covered in the "Health and Safety Training Instructions for Mercury Operations".

6.2 Quality Assurance

6.2.1 The process operators shall perform all operations according to procedure. All transfers of mercury will be pre-planned and approved by supervision.

6.2.2 The line supervisor checks and verifies all documents.

6.2.3 The detailed actions for insuring product quality are given in the supervisor's equipment operating instructions.

6.3 Equipment and Material

These are detailed in the supervisor's equipment operating instructions.

6.4 Transfer mercury from storage facilities to Pit Tanks F-3 and F-4 (see Figure 1). Process operators under directions of a line supervisor.

6.4.1 Checks piping, valves, and pumps before transferring any mercury.

6.4.2 Checks mercury levels of tanks and valve settings before and after mercury transfer.

6.4.3 Drains or pumps mercury to Tanks F-3 and F-4.

6.4.4 Withdraws a control sample for analysis from F-3 or F-4 prior to pumping to storage tank F-1451.

6.5 Transfers a batch of mercury from pit tanks to storage tank for flasking (see Figure 1).

6.6 Pumps mercury from storage tank to the pressure head tank, recirculating continuously during working hours.

6.7 Fills the flasks (3.1) with mercury and palletizes.

6.7.1 Initially adjusts the metering valve to deliver seventy-six (76) pounds of mercury to the volumetric flask, plus some overflow.

6.7.2 Activates the metering valve to fill the volumetric tank. (This has a movable volume displacement rod to insure weight control.)

6.7.3 Reads the scale dial to assure seventy-six (76) pounds weight in the volumetric flask.

6.7.4 Drains the volumetric flask into a flask (Ref. 3.1).

6.7.5 Plugs and palletizes the filled flask.

6.7.6 Flasks the contents of the storage tank by repeating the above.

6.7.7 Sampling - Withdraws a mercury sample during the filling of flasks from the first and the last pallet flasked from the storage tank and composites. This composite will be analyzed for purity of that batch of mercury and will certify the chemical composition of the lots filled from that batch. (Ref. 3.4).

6.8 Stores the palletized mercury flasks in designated locked storage areas.

6.9 Documents the operations by maintenance of records, logs, and data sheets of all transfer, flasking, and storage movement of mercury, accounting for quantities and pallet identities.

APPENDIX D

HEALTH AND SAFETY TRAINING INSTRUCTION FOR MERCURY OPERATIONS

HEALTH AND SAFETY TRAINING INSTRUCTION FOR MERCURY OPERATIONS

1.0 OBJECTIVES

1.1 To describe the proposed work and areas.

1.2 To outline the potential hazards.

1.3 To outline the protective measures to be used.

2.0 REFERENCES

Y-12 Industrial Hygiene Group will provide data on toxicity levels of mercury vapor, recommended respiratory equipment for known levels of mercury vapor concentration, and current information on mercury safety.

3.0 DEFINITIONS

3.1 Threshold Limit Value (TLV): Is that concentration of a substance in air that will not cause any physiological disorder when breathed for an eight (8) hour day or a forty (40) hour week. For mercury, this is 0.05 mg/M^3.

3.2 Time Weighted Average (TWA): Instances of mercury concentration greater than the TLV may be an acceptable working atmosphere providing the total exposure (the product of time and concentration) does not exceed the product of TLV and eight (8) hours.

4.0 RESPONSIBILITIES

4.1 Area Supervisor:

4.1.1 Assigns personnel.

4.1.2 Assures complete training in the Industrial Hygiene and Safety aspects of the work.

4.1.3 Provides adequate safety equipment and assures instructions on its use.

4.1.4 Arranges for personnel and area monitoring.

4.2 Line Supervisor:

4.2.1 Knows the Industrial Hygiene and Safety aspects of all jobs and areas under his control.

4.2.2 Insures that ventilating equipment is in good operating condition.

4.2.3 Communicates with Health Physics personnel regarding existing conditions; requests special surveys as needed.

4.2.4 Keeps process operators informed of current conditions in their assigned work areas, and of the recommended safety equipment and practices for those conditions.

4.2.5 Assures that conditions and regulations are known and followed by all personnel in the area.

4.2.6 Holds a formal safety meeting monthly, covering existing and potential safety and industrial hygiene hazards. Holds safety discussions as necessary to insure safety consciousness in all operators.

4.3 Process Operators:

4.3.1 Acquires a working knowledge of and a respect for the Industrial Hygiene and Safety hazards incurred in mercury flasking operations.

4.3.2 Uses safety equipment in designed area, and in the prescribed manner. Keeps all equipment in functional condition.

5.0 OPERATIONS

5.1 Scope of the work

5.1.1 Load the mercury now stored in tanks and columns in Building 9201-4 into steel mercury flasks made to GSA approved UCC-ND Specifications YS-2842. This major flasking operation is estimated at six (6) to eight (8) months duration. Additional flasking may be required after the equipment is washed down.

5.1.2 Keep the work areas clean to reduce the mercury vapor concentration to the lowest practical value. TLV where ever possible. If a significant amount of mercury is spilled, the personnel in the area will wear adequate respiratory protection until the measured mercury vapor concentration is again within established limits.

5.1.3 Operator assignments or work stations are:

5.1.3.1 Flask filling.

5.1.3.2 Flask plugging.

5.1.3.3 Palletizing.

5.1.3.4 Material handling.

5.1.3.5 Mercury transfer.

5.1.3.6 Mercury clean up.

The details of these activities are given in the "Supervisor's Instructions".

5.2 Industrial Hygiene:

5.2.1 Physical Effects - The physical and physiological effects of mercury poisoning are obviously harmful. These effects will be presented by members of the Industrial Hygiene Group.

5.2.2 Means of Ingestion - In order of probable occurrence.

5.2.2.1 Breathing.

5.2.2.2 Eating and drinking.

5.2.2.3 Direct skin contact.

5.2.3 Detection

5.2.3.1 The presence of mercury and mercury vapors and its degree of concentration will be measured by Health Physics Group technicians working under the supervision of the Industrial Hygiene Group. Also mercury vapor detectors will be required at selected work stations to monitor the TWA for mercury vapor exposure in those areas.

5.2.3.2 All personnel actively involved in the mercury flasking operation shall participate in the Mercury Urinalysis and X-Check Programs. These programs will start at the beginning of the mercury flasking operations.

5.2.4 Prevention and Control of Hazards

5.2.4.1 The best method of controlling the mercury hazard is to eliminate its source - exposed mercury. Exercise care in transfer of mercury to prevent spills and splashing. All mercury spills are to be cleaned up immediately. Tanks, drains and catch basins should have a cover of water, with a retaining curb, to cover the mercury surface. (Because of its required decontamination after mercury exposure, the volume of water should be kept to a minimum.)

Reduce mercury vapor concentration by efficient exhaust ventilation, away from work areas.

5.2.4.2 Inhalation. This is considered the prevailing hazard. Air having less than 0.05 mg/M3 (TLV) mercury vapor concentration is not considered hazardous to health. Degrees of increasing concentration require increased protective methods. Health Physics Group technicians will perform a walk-through survey twice daily with direct-reading mercury vapor detectors. A copy of the recorded results will be given to the line supervisor. They may also indicate the recommended type of respiratory protection needed for conditions prevailing at each work station or area.

TABLE 1

REQUIRED RESPIRATOR USAGE AT ELEVATED MERCURY CONCENTRATIONS

Hg Mg/M3	Respirator Type
Less than 0.05	None. (This allows for excursions to 0.15 mg/M3 for short periods, but TWA must not be exceeded.)
Greater than 0.05 Less than 0.25	I, II, III, IV
Greater than 0.25 Less than 5.0	II, III, IV
Greater than 5.0	III, IV

Type	Respirator Description
I	Half face respirator with iodine - impregnated charcoal filter cartridge (Mersorb)
II	Full face mask; iodine impregnated charcoal filled canister (Mersorb)
III	Type C positive supplied air respirator.
IV	Self-contained breathing apparatus.

5.2.4.3 Ingestion

Eating, drinking, and smoking will not be permitted in the mercury work area. Food, drink, and tobacco should be left in an uncontaminated area. All personnel should wash their hands thoroughly before leaving the area for lunch, smoking, etc.

5.2.4.4 Skin Contact

Each employee subject to exposure to mercury contact will be supplied safety shoes and a daily change of company clothing. Should mercury make physical contact with any person, he should shower and change clothes as soon as practical.

Jewelry, or other articles having an affinity for mercury - gold, silver, copper, lead, or porous materials should not be worn in the mercury operations area.

All personnel directly involved with mercury will be required to shower and wash their hair daily at the end of the work-shift, or as direct exposure may require. Thorough washing will be necessary to remove all mercury contamination.

Work gloves should be worn and care exercised to avoid direct skin exposure to jets of mercury; or exposure of cuts or other breaks in the skin.

5.3 Safety

5.3.1 Flasks of mercury are deceiving because of the high density of the mercury. A flask is small in size but weighs approximately 86 pounds when full. Use approved techniques for lifting or handling the flasks and pallets.

5.3.2 Should any personnel be required to enter a tank for equipment repair, cleaning, etc., the requirements of Health and Safety Procedure 70-750 will be met as well as the Industrial Hygiene requirements above.

6.0 All personnel receiving health and safety instructions will sign Employee Training Report UCC-ND Form 5540 upon completion of the series of instructions.

ChemRisk/Shonka Research Associates, Inc., Document Request Form

(This section to be completed by subcontractor requesting document)

Susan Flack / _____
Requestor — Document Center (is requested to provide the following document)

Date of request _____ Expected receipt of document _____

Document number* K-OA-50, KD-1465, KD-1025 Date of document 1955

Title and author (if document is unnumbered)

reviewed 1-96: docs are SRD, but not relevant to D.R.

-Do not copy just send to Y-12 so S. Flack can view them. SRD 8/18/95

(This section to be completed by Do

Sheila,

Date request received _____

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Susan Flack would like for these documents to be sent over to Y-12 so that she can review them there (She would prefer to view the ~~un~~classified version rather than receive a sanitized version in the mail) Send the documents to: Donna Lawson at Y-12 Thanks Jen

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Date document received _____

Signature _____

* Copies made and sent to Y-12 Plant Records for Susan Flack's Review 8/28/95 (Attn: Donna Lawson) - We did not want to loan K-25 Record Copy; therefore a copy was made. L Thornton 8/28/95

Note to Donna Lawson -

Please hold these for Susan Flack to review. These copies are being provided to you for Y-12 Site Records files use in processing ChemRisk's request. Although these have a K- prefix they contain Y-12 technology and will need to be processed through the Y-12 Classification Office.

Call if you have any questions.

Sheila Thornton
4/28/95

DOCUMENT DESCRIPTION (Completed By Requesting Division)

Document No.	Author's Telephone No.	Acct. No.	Date of Request
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Unclassified Title: CLASS 03 CHEMICAL ISSUES (Box # 9-1-16)
1979 Hg inventory info. / 1986 price info. Hg

Author(s): Requested by Steve Wiley

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☒ Other (Specify): To Be Released for Phase II of HSA

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CONSOLIDATED STORES CATALOG

GROUP 03 CHEMICALS AND GASES

26th Edition

March, 1986

OPERATED BY
MARTIN MARIETTA ENERGY SYSTEMS, INC.
FOR THE UNITED STATES
DEPARTMENT OF ENERGY

	UNIT	PRICE	STK PT	CATALOG NO	BUYER
MERCURIC IODIDE, RED, POWDER, RACS, 1/4 LB BTL, NO. M188 FSCO, MKDT 1074, MCB MX395, JTB 2608-4 (UCC-ND CODE -- H-4, F-0, R-0)	BTL	14.38	3	03-091-3008	33
MERCURIC NITRATE, CRYS, REAG, B&A 1988, JTB 2614, FSCO M188, MCB MX380					
1 LB BTL (UCC-ND CODE -- H-4, F-0, R-0, A- , S-4)	BTL	41.95	23	03-091-4006	33
1/4 LB BTL (UCC-ND CODE -- H-4, F-0, R-0, A- , S-4)	BTL	26.60	3	03-091-4016	33
MERCURY METAL, TRIPLE DISTILLED OR RECLAIMED, (COMMERCIALLY PURE - GOLDSMITH BROS) (UCC-ND CODE -- H-4, F-0, R-0, A- , S-4)	LB	4.80	5	03-091-9016	33
MERCURY METAL, TRIPLE DISTILLED, UCCND RECLAIMED, 10 LB CONT (UCC-ND CODE -- H-4, F-0, R-0, A- , S-4)	LB	3.86	12	03-091-9017	33
MERCURY METAL, TRIPLE DISTILLED, 8 LB POLYETHYLENE BTL, MS 03-A0-2, AMEND 1 (UCC-ND CODE -- H-4, F-0, R-0, A- , S-4)	BTL	51.02	23	03-091-9026	33
MOLYBDENUM METAL, POWDER, MINUS 200 MESH, 99.9 PERCENT MIN MOLYBDENUM (EXCLUDING OXYGEN), OXYGEN CONTENT 0.150 PERCENT MAX, 3.5 TO 5.0 MICRONS	LB	NA	2	33-093-5000	33
MOLYBDENUM METAL, POWDER, 99.8 PERCENT PURE, 1/4 LB BTL, FSCO M-248 OR MCB MX1585	BTL	9.83	3	03-093-5007	33
NICKEL CHLORIDE, CONCENTRATED SOLUTION, NI 15 OZ PER GAL MIN, 5 GAL CONTAINER, M & T CHEMICALS (UCC-ND CODE -- H-4, F-0, R-0, A- , S-4)	CONT	52.75	1	03-097-1388	33
NICKEL CHLORIDE, TECH, FOR ELECTROPLATING, 100 LB CONT, HACO, VENDOR TO FURNISH 4 COPIES OF STATEMENT THAT MATERIAL SUPPLIED IS NICKEL CHLORIDE NI Cl2 - 6 H20 (UCC-ND CODE -- H-4, F-0, R-0, A- , S-4)	LB	.75	2	03-097-1408	33
NICKEL CHLORIDE, THE FOLLOWING ARE MAX. LIMITS - COBALT 0.020%, TOTAL HEAVY METALS 0.005%, COPPER 0.003%, LEAD 0.003%, MAGNESIUM, CALCIUM & INSOLUBLE MATTER 0.1%	LB	1.33	1	03-097-1420	33
NICKEL METAL, BUTTONS, S-NICKEL, ELECTROLYTIC FOR ANODE USE, PER SPEC:					
NICKEL 99.95 PERCENT COBALT TRACE SULPHUR 0.02 COPPER 0.01 IRON 0.01 CARBON 0.01					
550 LB DRUM, MCGEAN CHEMICAL CO	DRUM	2139.69	2	03-097-2788	73
NICKEL METAL, POWDER, 100 GM BTL, MCB NX300 (UCC-ND CODE -- H-4, F-1, R-1)	BTL	38.40	2	03-097-2808	33
NICKEL METAL, POWDER, REDUCED, PURIFIED, (COBALT LOW), 1 LB BTL, FSCO N-40 OR MCB NX300 (UCC-ND CODE -- H-4, F-1, R-1)	BTL	19.61	3	03-097-2848	33
NICKEL, POWDER	LB	3.50	2	03-097-2849	33
NICKEL SULFAMATE, CONCENTRATED SOLUTION, NI 20 OZ PER GAL MIN, 5 GAL CONTAINER, M & T CHEMICALS	CONT	89.87	1	03-097-2968	33
NICKEL SULFATE, CONCENTRATED SOLUTION, NI 18 OZ PER GAL MIN, 5 GAL CONTAINER, M & T CHEMICALS (UCC-ND CODE -- H-3, F-0, R-0, A- , S-4)	CONT	36.85	1	03-097-2985	33
NICKEL SULFATE, (SINGLE NICKEL SALTS), ELECTROPLATING GRADE, 100 LB CONT, HACO (UCC-ND CODE -- H-3, F-0, R-0, A- , S-4)	LB	1.24	2	03-097-3008	33
NICKEL SULFATE, NO. 103, HARSHAW CHEMICAL CO, NO SUB 100 LB BAG OR 400 LB DRUM	LB	1.18	1	03-097-3028	33
NICKELOUS NITRATE, CRYS, REAG, 500 GM BTL, MKDT 6394, MCB NX330, JTB 2784 (UCC-ND CODE -- H-3, F-0, R-1)	BTL	14.25	3	03-097-7008	33
PHOSPHOROUS, AMORPHOUS, RED POWDER, 1 LB CAN OR BTL, MKDT 6620, FSCO P103, MCB PX1020, JTB 9358-1	BTL	11.73	3	03-106-1001	33
PHOSPHOROUS PENTACHLORIDE, REAGENT, 1 LB BTL, NO. 2084 B&A, FSCO P107, MCB PX1030, JTB 9369-1 (UCC-ND CODE -- H-3, F-0, R-2, A- , S-1)	BTL	31.50	3	03-106-5001	33

V-12 CLASS 03 CHEMICAL ISSUES
FOR THE PERIOD 10/1/78 THROUGH 9/30/79

Box 9-1-16

RUN DATE 03/26/80
PAGE 17

CATALOG NUMBER	DESCRIPTION	QUANTITY ISSUED	ISSUE UNIT	UNIT PRICE	TOTAL VALUE	ACCOUNT NUMBER			DEPT. NO.	DATE ISSUED
		42			316.43					
03-086-8004	MAGNESIUM SULFATE	1	BTL	3.234	3.23	2377-0000	30057000	423646	2377	05-23-79
03-086-8004	MAGNESIUM SULFATE	1	BTL	3.234	3.23	2238-0000		4[illegible]324	4455	07-16-79
03-086-8004	MAGNESIUM SULFATE	2	BTL	3.234	6.47	2624-0000	30044200	4[illegible]844	2010	08-28-79
		4			12.93					
03-086-8024	MAGNESIUM SULFATE	100	LB	.450	45.00	2677-0940		411248	2617	10-11-78
03-086-8024	MAGNESIUM SULFATE	100	LB	.450	45.00	2677-0940		411248	2617	11-02-78
03-086-8024	MAGNESIUM SULFATE	100	LB	.450	45.00	2677-0940		411248	2617	11-15-78
03-086-8024	MAGNESIUM SULFATE	100	LB	.451	45.10	2677-0940		411248	2617	12-20-78
03-086-8024	MAGNESIUM SULFATE	200	LB	.450	90.00	2677-0940		411248	2617	01-22-79
03-086-8024	MAGNESIUM SULFATE	100	LB	.410	41.00	2677-0930		411248	2617	04-10-79
03-086-8024	MAGNESIUM SULFATE	200	LB	.410	82.00	2677-0940		411248	2617	05-04-79
03-086-8024	MAGNESIUM SULFATE	100	LB	.410	41.00	2677-0940		411248	2617	06-15-79
03-086-8024	MAGNESIUM SULFATE	200	LB	.410	82.00	2677-0940		411248	2617	07-24-79
03-086-8024	MAGNESIUM SULFATE	200	LB	.410	82.00	2677-0940		411248	2617	09-06-79
		1400			898.10					
03-091-2006	MERCURIC CHLORIDE	1-	BTL	4.085	4.09-	2241-0000		415563	2133	04-18-79
		1-			4.09-					
03-091-9017	MERCURY METAL	46-	LB	3.120	143.52-	2377-0000	30057100	2[illegible]345	2377	11-16-78
03-091-9017	MERCURY METAL	96-	LB	3.120	299.52-	2377-0000	30057100	2[illegible]345	2377	01-30-79
03-091-9017	MERCURY METAL	9-	LB	3.120	28.08-	2377-0000	30057100	2[illegible]345	2377	06-22-79
03-091-9017	MERCURY METAL	100	LB	3.120	312.00	2585-0000	30056100	4[illegible]282	2133	08-30-79
03-091-9017	MERCURY METAL	72-	LB	3.120	224.64-	2624-0000	30044200	244385	2077	08-23-79
		77			240.24					
03-091-9025	MERCURY METAL	6	BTL	46.300	276.80	2377-0000	30057100	2[illegible]345	2377	11-16-78
03-091-9025	MERCURY METAL	1	BTL	24.880	24.88	2238-0000		3[illegible]288	2426	12-04-78
03-091-9025	MERCURY METAL	12	BTL	24.880	298.56	2377-0000	30057100	2[illegible]345	2377	01-30-79
03-091-9025	MERCURY METAL	12	BTL	24.880	298.56	2377-0000	30057100	2[illegible]345	2377	06-22-79
03-091-9025	MERCURY METAL	4	BTL	24.880	99.52	2702-0000	30026200	412824	2077	05-23-79
03-091-9025	MERCURY METAL	1	BTL	24.880	24.88	2388-0000		295095	2388	06-27-79
03-091-9025	MERCURY METAL	5	BTL	53.078	265.39	2624-0000	30044200	244385	2077	09-24-79
		40			1288.20					
03-097-1408	NICKEL CHLORIDE TECH	100	LB	1.097	109.70	2625-0000		408228	2625	01-30-79
03-097-1408	NICKEL CHLORIDE TECH	100	LB	1.097	109.70	2625-0000		409205	2625	01-30-79
03-097-1408	NICKEL CHLORIDE TECH	450	LB	1.096	493.20	2625-0000		408228	2625	03-13-79
03-097-1408	NICKEL CHLORIDE TECH	100	LB	1.095	109.50	2625-0000		409205	2625	07-23-79
03-097-1408	NICKEL CHLORIDE TECH	50	LB	1.095	54.75	2625-0000		415743	2625	07-31-79
03-097-1408	NICKEL CHLORIDE TECH	50	LB	1.095	54.75	2625-0000		415743	2625	08-01-79
03-097-1408	NICKEL CHLORIDE TECH	100	LB	1.095	109.50	2625-0000		415743	2625	08-01-79
03-097-1408	NICKEL CHLORIDE TECH	150	LB	1.095	164.25	2625-0000		415743	2625	08-09-79

cy. w/encls: Fee (2) - RC
Williams
JMC, 12-9-81

XEROX COPY: W. J. Yaggi/RDW 12-9-81

Department of Energy
Oak Ridge Operations
P.O. Box E
Oak Ridge, Tennessee 37830

December 2, 1981

Union Carbide Corporation
Nuclear Division
ATTN: Mr. J. M. Case
Y-12 Plant Manager
Post Office Box Y
Oak Ridge, Tennessee 37830

Gentlemen:

AMENDMENT NO. 14 TO MEMORANDUM OF AGREEMENT NO. GS-00P-23195(SCM)

Enclosed are two executed copies of subject amendment for your files. This amendment authorizes an increase in handling charges for mercury from $48.00 to $57.00 for the first pallet and from $11.50 to $13.50 for each additional pallet. The storage rate for mercury will increase from $0.55 to $0.65 per square foot of warehouse space for FY-1982.

Quarterly billings for services under this agreement will continue to be submitted to GSA on SF-1080 by your organization. This amendment and all other provisions of the agreement remain in force through September 30, 1982.

Sincerely,

H. D. Hickman
Assistant Manager
for Defense Programs

AD-462:RLR

Enclosures:
As stated

COPY

AMENDMENT NO. 14
to
MEMORANDUM OF AGREEMENT
NO. GS-00P-23195(SCM)
BETWEEN
GENERAL SERVICES ADMINISTRATION
FEDERAL PROPERTY RESOURCES SERVICE
AND
U. S. DEPARTMENT OF ENERGY
OAK RIDGE OPERATIONS

This amendment, entered into between the Federal Property Resources Service, hereinafter called "FPRS," of the General Services Administration, and the United States Department of Energy, Oak Ridge Operations, hereinafter called "DOE," relating to the handling and storage of mercury held in the National Defense Stockpile and surplus lithium held in GSA Inventory for disposal under Sec. 203 of the Federal Property and Administrative Services Act of 1949, as amended, (Property Act) and other related services for FPRS, within the scope of DOE's authorities and responsibilities, provides that Agreement No. GS-00P-23195(SCM), as set forth in Amendment No. 13, is hereby further amended as follows:

I. TERM OF AGREEMENT

The expiration date of September 30, 1981, is hereby deleted and the date, September 30, 1982, is substituted therefor.

IV. CHARGES FOR SERVICES

A. The storage rate for mercury appearing in item IV A of the Agreement is hereby changed to read "0.65 per square foot per year" for space occupied. This rate to be effective October 1, 1981.

B. The cost reimbursement rate for the outloading and related services for mercury appearing in item IV B of the Agreement is hereby deleted and the following substituted therefor:

Mercury	$57.00 for the first pallet $13.50 for each additional pallet

This rate is effective October 1, 1981.

Except as herein amended, all other terms and conditions of the Agreement shall remain in full force and effect.

ACCEPTED BY:

UNITED STATES DEPARTMENT OF ENERGY

BY Chas. H. Dunham

TITLE Director, Supply Division

DATE November 12, 1981

ACCEPTED BY:

GENERAL SERVICES ADMINISTRATION
FEDERAL PROPERTY RESOURCES SERVICE

BY J. T. Consiglio
J. T. CONSIGLIO

TITLE Director, Technical Services Staff

DATE November 18, 1981

XEROX COPY: M. J.Yaggi/RDW 11-24-82

UNION CARBIDE CORPORATION
NUCLEAR DIVISION
P. O. BOX Y, OAK RIDGE, TENNESSEE 37830

November 22, 1982

Department of Energy
Oak Ridge Operations
Attention: Mr. H. D. Hickman
Post Office Box E
Oak Ridge, Tennessee 37830

Gentlemen:

Mercury Storage, Handling, and Related Services Under Memorandum of Agreement No. GS-000-23195 (SCM), Amendment No. 15

Reference is made to your letter dated October 8, 1982, related to the above subject. The cost reimbursement rates as stated in Amendment No. 14 should be changed to reflect increased costs as follows:

Item	
3	The rate of reimbursement for the outloading of mercury should be changed from $57.00 to $60.75 for the first pallet and from $13.50 to $14.25 for each additional pallet.
4	The storage rate for mercury will increase from $.65 to $.68 per square foot of warehouse space for FY 1983.

All other terms and conditions of the agreement are satisfactory as written for mercury storage, handling, and related services in connection with GSA-owned mercury during FY 1983.

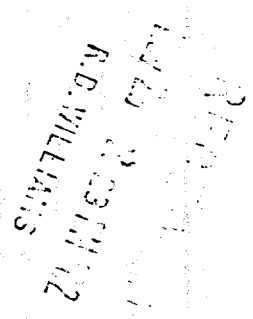
Very truly yours,

Gordon G. Fee, Plant Manager
Oak Ridge Y-12 Plant

WGH:hym

Distribution:

H. D. Hickman, DOE-ORO (2)
G. G. Fee
R. F. Hibbs
H. M. Oakes
J. B. Sykes - RC
R. D. Williams



Y-12 Hg Uses

DATE: 3-13-97 AM	TELEPHONE MEMORANDUM	PROJECT NO. ORR 0406143O
TIME: 3 (PM) MST		
(TO) (FROM) MR. Joe Shorka		ROUTING
COMPANY		
RECORDED BY Sm Flack, Task 2		
PROJECT Mercury Use in U Enrichment Ops		FILE

live recorders to measure U ? tube racks ?
↳ ionization chambers
mass spectrometer - vacuum required
oil (diffusion pumps) would crack UF_6
so ∴ Hg instead of oil

1950's
1400's

↗ ORGDP

U metal in solutions @ Y-12

Thermocouples had a
Heat conducting Medium (Hg)

TO: SUSAN FLACK FAX (303) 939-8318

FROM: JACK BUDZIAN BAUM

DATE: 5/23/96

Here's the memo I told you about. The Hg was used in the vacuum pumps for the Y-12 calutron (1993-1996 I'll look through the Calutron UCNI document to see if I can get you the # of pumps used at Y-12, volume of Hg, etc.

Talk to you later

Jack

INDUSTRIAL HYGIENE
INVESTIGATION

July 20, 1944

LOCATION: 9202 Room #10

REQUESTED BY: Safety Department, Mr. Goldstein

INVESTIGATED BY: S. B. Smith

NATURE OF HAZARD: Mercury purification has recently been taken over by Mr. De Haan. This consists of washing and distillation. The washing is performed with aeration in a closed system. An all metal still is used for distillation. This still and the cleaned mercury storage area are completely enclosed in a large hood with good draft which is used for this purpose alone. The hood discharges at the rear of the building about ten(10) feet above the ground. No other buildings are located near this vent.

DETERMINATIONS: None.

DISPOSITION: At present the situation does not seem hazardous. Mr. De Haan stated that his group had been well instructed on the toxicity of mercury.

S. B. Smith

Stanton B. Smith
Industrial Hygienist

rnb

UCN-7721B (3 5/96)

OAK RIDGE Y-12 PLANT INFORMATION CONTROL FORM

X/TS-1294/15/DEL REV DOCUMENT DESCRIPTION (Completed by Requesting Division)

Document No.	Date of Request	Requested Date of Release (Allow 5 to 10 Days)	Page Count
Y/TS-1294/15/DEL REV	11-06-96		3

Unclassified Title: INTERVIEW NOTES TAKEN BY S. FLACK ON NOVEMBER 6 1996 Hg-Th

Author's / Requestor's Name	Telephone No., Pager No. and Plant Address	Account Number
S. W. Wiley	6-0263, 417-5417, Bldg. 9106, MS-8023	2366-0003

INTENDED AUDIENCE: ☐ Public ☐ Environmental Regulators ☐ NWC ☐ DOE Contractors ☒ Other ChemRisk

TYPE: ☐ Abstract ☐ Brochure ☐ Co-op Report ☐ Formal Report ☐ Informal Report
☐ Invention Disclosure ☐ Journal Article ☐ News Release ☐ Photograph/Visuals ☐ Technical Progress Report
☐ Thesis/Term Paper ☐ Videotape ☐ Other
☐ Oral Presentation (identify meeting, sponsor, location, date):

PATENT OR INVENTION SIGNIFICANCE ☐ Yes ☐ No (Identify) Document will be published in proceedings ☐ Yes ☐ No
Document has been previously released ☐ Yes ☐ No (Reference) Document will be distributed at meeting ☐ Yes ☐ No

This document contains unclassified controlled information. ☐ YES ☐ NO (If yes, please identify the category(s) by checking the applicable space(s) below.)

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☐ Other (Identify)		

DIVISION REVIEW AND APPROVAL (Completed by Requesting Division)

CLASSIFICATION REVIEW (Authorized Derivative Classifier (ADC))

Classification of: Title: U Abstract —

DOCUMENT: Level SECRET* Category RD

BAYLOR JR [signature] 11/6/96
Print Name Signature Date

* CLASSIFIED INFORMATION DELETED) RB 2/27/97

DOCUMENT REQUEST APPROVED (Division/Department Mgr.)

S. W. Wiley TOA/HS Coordinator
Please Print Name and Title

[signature] 11-26-96
Signature Date

APPROVAL AND RELEASE (Completed by the Classification/Technical Information Control Office)

CLASSIFICATION OFFICE:

Title: U Abstract: NA

DOCUMENT: Level U (w/Releases) Category —

Weapons Data — Sigma —

[signature] 11/6/96
Y-12 Classification Office Date

RF 2/27/97

☐ Waived /P. McKenney 11/7/96
Patent Office Date

☐ Date

☐ Date

☐ Date

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Request Approved P. McKenney 2/28/97

P. L. McKenney 11/7/96
Y-12 Technical Information Office Date

Additions/Remarks: Additional sanitized page added 2/27/97.

Hg-Thallium Release Calculation(U) 2-21-97

S. Flack

µ1of1

Hg-Th
30 lb. alloy bottle

[ ] units produced (assume [ ])

[ ] lbs. alloy

[ ] % of alloy used per unit

[ ] lbs. alloy

x.08 % Hg in alloy

32.à lbs. Hg

1. O_2 (air) → closed system handling
2. Tested for leaks by purging [ ] → some residual Hg released from hood to stack to outside environment
3. Tested every [ ] units tested
4. Bits-4 operation cleaned [ ] with nitric acid (aq) - some minor quantity in ~~release to~~ H_2O waste stream
5. even if all Hg in alloy was released ~[ ] lbs.
6. unused alloy returned to 70 lb. mercury flasks and stored on site → someone is working on separating out the Hg from the Th.

11/11/96

UCN-7721B
(2 8/96)

OAK RIDGE Y-12 PLANT INFORMATION CONTROL FORM

Per. list

Y/TS-1294/15/DEL REV DOCUMENT DESCRIPTION (Completed by Requesting Division)

Document No.	Date of Request	Requested Date of Release (Allow 5 to 10 Days)	Page Count
Y/TS-1294/15/DEL REV	11-06-96		3

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Author's / Requestor's Name	Telephone No., Pager No. and Plant Address	Account Number
S. W. Wiley	6-0263, 417-5417, Bldg. 9106, MS-8023	2366-0003

INTENDED AUDIENCE: ☐ Public ☐ Environmental Regulators ☐ NWC ☐ DOE Contractors ☒ Other ChemRisk

TYPE: ☐ Abstract ☐ Brochure ☐ Co-op Report ☐ Formal Report ☐ Informal Report
☐ Invention Disclosure ☐ Journal Article ☐ News Release ☐ Photograph/Visuals ☐ Technical Progress Report
☐ Thesis/Term Paper ☐ Videotape ☐ Other
☐ Oral Presentation (identify meeting, sponsor, location, date):

PATENT OR INVENTION SIGNIFICANCE ☐ Yes ☐ No (Identify) Document will be published in proceedings ☐ Yes ☐ No
Document has been previously released ☐ Yes ☐ No (Reference) Document will be distributed at meeting ☐ Yes ☐ No

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- ☐ Export Controlled Information
- ☐ Safeguards Information
- ☐ Privacy Act Information
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- ☐ Applied Technology Information
- ☐ Naval Nuclear Propulsion Information
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- ☐ Lockheed Martin Proprietary
- ☐ Lockheed Martin Use Only
- ☐ Energy Systems Sensitive
- ☐ Internal Use Only
- ☐ Official Use Only

DIVISION REVIEW AND APPROVAL (Completed by Requesting Division)

CLASSIFICATION REVIEW [Authorized Derivative Classifier (ADC)]

Classification of: Title: U Abstract: —

DOCUMENT: Level SECRET* Category RD

R BAYLOR JR (Print Name) R Baylor JR (Signature) 11/6/96 (Date)

(* CLASSIFIED INFORMATION BRACKETED)

DOCUMENT REQUEST APPROVED (Division/Department Mgr.)

S. W. Wiley TOA/HS Coordinator
Please Print Name and Title

S. W. Wiley (Signature) 11-06-96 (Date)

APPROVAL AND RELEASE (Completed by the Classification/Technical Information Control Office)

CLASSIFICATION OFFICE:

Title: U Abstract: NA

DOCUMENT: Level U (w/deletions) Category —

Weapons Data — Sigma —

R. F. Traser (Y-12 Classification Office) 11/6/96 (Date)

☐ Waived / P. McKenney (Patent Office) 11/7/96 (Date)
☐ (Date)
☐ (Date)
☐ (Date)

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Request Approved

P. L. McKenney (Y-12 Technical Information Office) 11/7/96 (Date)

Conditions/Remarks:

Y/TS-1294/15 DEL REV

(Title) INTERVIEW NOTES
TAKEN BY S. FLACK ON
NOVEMBER 6, 1996

Read in 1996

Authorized Derivative Classifier

Authorized Signature 11/6/96 Date

Authorized Derivative Declassifier

Authorized Signature 11/6/96 Date

This material has been reviewed by the Y-12 Classification office and has been determined to be UNCLASSIFIED.

APPROVED FOR PUBLIC RELEASE

P. L. McKenney 11/7/96
Technical Information Office Date

THIS PAGE MUST NOT BE SEPARATED FROM THE ATTACHED DOCUMENT

MERCURY INTERVIEW
JIM RADLE (40392)

SM Flack
11-6-96
p. 1

Dick Baywood - 4-1021
Gene Walker - warehouse 4-3720

amalgam Hg-Th ≡ got from Berdey (Allied Signal)
in ~ bottles sealed; used

closed system in hood hooked to a stack
tested for leaks - pressure release of air through tubing

also filled test vial 10cc, crimp-welded

left over
poured into 75 lb. mercury bottles, stored somewhere
land + sea container near
9720-18

spill:

to B-4 for nitric acid cleaning

so to inspect
B-4 also cleaned
one time

spilled and cleaned all of it up

Richard? Taylor - tried to figure out how to separate Hg
Paul? X-10 from Thallium

Buildings
9204-2E
9204-4 acid cleaning
9720-18 storage

came from Kansas City

H.H. sampling routine - check with Tom Ford

[redacted] at the Y-12 Plant

Mercury alloyed with thallium was used in the production of weapon components at the Y-12 Plant. The alloy used was mixed at the Allied Signal Kansas City Plant from mercury supplied by Y-12. The process which used this material is not currently active. The quantity of mercury in the form of mercury thallium alloy which was handled at Y-12 was small compared to the large quantities of pure mercury used in the lithium isotope separation processes. Approximately _____ kg of mercury thallium was used at Y-12; approximately _____ kg is currently stored in the Plant.

Susan M. Flack

Who could I interview about this? — LLOYD PORTER @ 4-3832 MUST BE IN PERSON!

1. Operation description (verbal because CRD/SRD)
2. Buildings
3. Maximum inventory quantity (and when)
4. Years of Operation
5. I.H. monitoring of air?
6. Liquid discharges? Spills?

[redacted] (303) 449-8471

~~WILLIAM THOMAS DISMANTLEMENT~~

- ~~ALEX LYNCH~~ → DON HUNICUTT (4 3642 ~~6 5045~~)
  → JIM LEDBETTER (62483)

Mercury Thallium at the Y-12 Plant

Mercury alloyed with thallium was used in the production of weapon components at the Y-12 Plant. The alloy used was mixed at the Allied Signal Kansas City Plant from mercury supplied by Y-12. The process which used this material is not currently active. The quantity of mercury in the form of mercury thallium alloy which was handled at Y-12 was small compared to the large quantities of pure mercury used in the lithium isotope separation processes. Approximately _____ kg of mercury thallium was used at Y-12; approximately _____ kg is currently stored in the Plant.

Susan M. Flack

Who could I interview about this?

Hg - Th

~~TWED~~ 30 min 6 9A

RBaylor 423-574-1766 7-3:30p 5-1:30p

RBaylor's office

Dennis Nabors Disss + Ass Ops
574-3671
873-9475 pager

yes Garner + Kochitsky
Proceedings of
"Radioactive Sds in TN River System"
J. of ~~Sanit~~ Engrs ~~Div~~ Vol. 82 (SA4) ~~Aug~~ 1956
ASCE
pp. 1-20

yes Tsuneo Tamura
~~Rad Dn~~
H Physics 1960

Y/TS-1629

Xcy. Ebert
Evans
Schwenn
Williams
JMC, 7-10-73

1h-220

UNITED STATES
ATOMIC ENERGY COMMISSION
OAK RIDGE OPERATIONS
P.O. BOX E
OAK RIDGE, TENNESSEE 37830

AREA CODE 615
TELEPHONE 483-8611

July 5, 1973

Robert Bulcock, Area Manager
Kansas City Area Office

DISPOSAL OF CLASSIFIED WASTES

Reference is made to your memorandum dated June 21, 1973, and to subsequent discussions with Messrs. Sund and Barkmeier of your staff on the above subject.

This will confirm that the classified, mercury-contaminated solid wastes can be buried at Y-12, and shipment can begin as soon as mutually agreed between Bendix and Y-12.

As discussed, it is estimated that about 15 drums of this material will be shipped this fiscal year and about the same amount in FY 1975. As indicated, this is an assortment of loosely packed materials such as gloves, kimwipes, etc. that may be compacted at Y-12.

The costs for handling, compaction if required, and burial of the material will be the same as that for the foam material currently being buried at Y-12. Applicable cost estimates were supplied in my letter to Mr. Colston, "Disposition of Bendix Classified Waste," dated November 6, 1972.

As in the past, funding for the work as well as pertinent instructions can be handled by the Integrated Contract Order (ICO).

Since the material is classified, it will be the responsibility of Bendix to arrange for the shipment and for the necessary security safeguards commensurate with the classification of the materials shipped. Also, the drums of mercury-contaminated material should be so identified.

For details on shipping arrangements, the contact will be J. W. Minchey, Extension 3-5981, Building 9720-6, at the Y-12 plant.

Please advise if you desire additional information.

Joseph A. Lenhard
Joseph A. Lenhard, Director
Research and Technical Support Division

ORW:EHH

cc: J. M. Case, UCCND
R. G. Jordan, UCCND
H. D. Hickman
W. H. Travis

R005994

Y/TS-1633 99

INTRA-LABORATORY CORRESPONDENCE

OAK RIDGE NATIONAL LABORATORY

~~February 27, 1975~~ Aug. 1, 1975

J. F. Marchaz
H. T. MILTON

Copy: R. L. Caldwell
G. J. Fisher
D. R. Hines
~~R. [illegible]~~
J. G. Tracy
File

Subject: Toxicity of Thallium

Thallium and its salts are toxic. Maximum allowable concentration in air is 0.1 mg/cu. meter. Resembles lead in its toxic properties and is a cumulative poison. It can cause damage to the eyes, loss of hair, attack on the nervous system, digestive tract, kidneys and circulatory system. Thallium compounds in solution are readily absorbed through the skin.

Personnel exposed to thallium or any of its salts should wear a respirator to avoid inhaling the material, protective clothing to avoid skin contact and chemical safety goggles for protection of the eyes. Personnel should be warned to avoid prolonged or repeated contact with this material or its salts, dry or in solution. Protective clothing worn when working with it should be washed often.

It should be prohibited to eat, smoke, or store lunches or food of any kind in the area where this is in use.

K. A. Spainhour

K. A. Spainhour

KAS:tsp

Robinson #
E005392

UCN-430
(3 8-61)

Y/TS-1633
(424)

UNION CARBIDE

INTERNAL CORRESPONDENCE

NUCLEAR DIVISION

POST OFFICE BOX Y, OAK RIDGE, TENNESSEE 37830

To (Name) Mr. Dick Cawood
Division
Location

Date January 22, 1975

Originating Dept. Industrial Hygiene

Answering letter date

Copy to File

Subject Health Hazards of Mercury-Thallium

In response to your question concerning the health hazards of mercury-thallium and the protection required, the following information is provided.

Mercury and thallium are both highly toxic metals by any route of entry into the body. Oral ingestion would not normally be a problem; therefore, inhalation or skin absorption must be avoided.

If a problem was encountered in the operation, an airline-respirator or respirators equipped with mersorb cartridges and rubber gloves would be recommended.

Any discussion or additional problems arising with this operation can be resolved by contacting the Industrial Hygiene Group at 3-5413.

J. F. Morehead

J. F. Morehead
Industrial Hygienist

JFM/sc

UCN-7721B
(2 8/96)

OAK RIDGE Y-12 PLANT INFORMATION CONTROL FORM

DOCUMENT DESCRIPTION (Completed by Requesting Division)

Document No.	Date of Request	Requested Date of Release (Allow 5 to 10 Days)	Page Count
EXT-00168	2/25/96		2

Unclassified Title: Extracted pages from: Y/TS-1633 "Compilations of Correspondence Pertaining to Use of Mercury at Y-12: Worker Health 12/96 L.L. McCauley

Author's / Requestor's Name	Telephone No., Pager No. and Plant Address	Account Number
S. W. Wiley	6-0263, 417-5417, 9106, MS-8023	2366-0002

INTENDED AUDIENCE: ☐ Public ☐ Environmental Regulators ☐ NWC ☐ DOE Contractors ☒ Other ChemRisk

TYPE: ☐ Abstract ☐ Brochure ☐ Co-op Report ☐ Formal Report ☐ Informal Report
☐ Invention Disclosure ☐ Journal Article ☐ News Release ☐ Photograph/Visuals ☐ Technical Progress Report
☐ Thesis/Term Paper ☐ Videotape ☐ Other _____
☐ Oral Presentation (identify meeting, sponsor, location, date): _____

PATENT OR INVENTION SIGNIFICANCE ☐ Yes ☐ No (Identify) _____ Document will be published in proceedings ☐ Yes ☐ No
Document has been previously released ☐ Yes ☐ No (Reference) _____ Document will be distributed at meeting ☐ Yes ☐ No

This document contains unclassified controlled information. ☐ YES ☐ NO [If yes, please identify the category(s) by checking the applicable space(s) below.]

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☐ Sensitive Nuclear Technology Information
☐ Export Controlled Information
☐ Safeguards Information
☐ Privacy Act Information
☐ Government Confidential Commercial Information
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☐ Energy Systems Sensitive
☐ Internal Use Only
☐ Official Use Only

DIVISION REVIEW AND APPROVAL (Completed by Requesting Division)

CLASSIFICATION REVIEW [Authorized Derivative Classifier (ADC)]

Classification of: Title: UNC Abstract: NA

DOCUMENT: Level UNC Category NA

S. W. Wiley (Print Name) — Signature — 2/25/97 (Date)

DOCUMENT REQUEST APPROVED (Division/Department Mgr.)

S. W. Wiley TOA/HS Coordinator (Please Print Name and Title)

Signature — 2/25/97 (Date)

APPROVAL AND RELEASE (Completed by the Classification/Technical Information Control Office)

CLASSIFICATION OFFICE:

Title: U Abstract: NA

DOCUMENT: Level U Category -

Weapons Data - Sigma -

R J Fraser — Y-12 Classification Office — 2/26/97 (Date)

☐ Waived P. McKenney — Patent Office — 2/28/97 (Date)
☐ _____ Date
☐ _____ Date
☐ _____ Date

DISTRIBUTION:
☒ UNLIMITED ChemRisk
☐ LIMITED _____
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Requestor — Date Initiated 2/25/97

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Request Approved
P. K. McKenney — Y-12 Technical Information Office — 2/28/97 (Date)

Conditions/Remarks:

Y/EXT--00168

Extracted pages from Compilations of Correspondence Pertaining to Use of Mercury at Y-12: Worker Health (Y/TS-1633)

Authorized Derivative Classifier

Authorized Signature 2/25/97 Date

Authorized Derivative Declassifier

Authorized Signature 2/26/97 Date

This material has been reviewed by the Y-12 Classification office and has been determined to be UNCLASSIFIED.

APPROVED FOR PUBLIC RELEASE

P. R. McKenney 2/28/97
Technical Information Office Date

THIS PAGE MUST NOT BE SEPARATED FROM THE ATTACHED DOCUMENT

H3EA83H-0518-143

CONFIDENTIAL

NUCLEAR DIVISION

UNCLASSIFIED

May 18, 1983

G. E. Isham, 9204-2E, MS-7
W. M. Simpson, 9204-2E, MS-7
R. L. Smith, 9204-2E, MS-7

Industrial Hygiene Sampling of 9204-2E Mercury Thallium Operation

The mercury thallium operation in 9204-2E has now been entered into the industrial hygiene monthly sampling program. The area was sampled on May 6, 1983. The threshold limit value for airborne concentration of mercury vapor is 0.05 mg/M3. This represents a level at which the average person may be repeatedly exposed to day after day without adverse health effect. The results of the samples taken are as follows:

Sample Number	Results mg/M3
1.	.020
2.	.018
3.	.028
4.	.019
TLV	.05

On May 17, 1983, a part was sent to 9204-2E X-ray with mercury contamination visible on the outside. I would like to emphasize that everything leaving the mercury thallium area must be clean and free of visible mercury contamination. Your cooperation in ensuring this will be greatly appreciated.

If you have any questions concerning this matter, please call 6-7182.

Tom Ford

R. T. Ford, 9106, MS-4 (6-7182)
Industrial Hygiene Department

RTF:sc

cc: File - RTF - NoRC

UNCLASSIFIED

CONFIDENTIAL

CRD
M Carey
Consultant
3/7/90

~~CONFIDENTIAL~~

Y/HG-0257

UNCLASSIFIED

M-361

Industrial Hygiene Sampling of
9204-2E Operation ~~Leg~~

May 18, 1983 Letter From
R. T. Ford to G. E. Isham, Etal

DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW

1st Reviewer: K. F. Clugh (Name)
Authority: O ADC O ADD
Date: 22 July 1994
2nd Reviewer: O. K. McConnell, Jr. (Name)
Authority: ● ADD
Date: 7.29.94

Determination 2, 4 [Insert Number(s)]
1. Classification Retained
2. Classification Changed To: U
3. Contains No DOE Classified Information
4. Classification Cancelled
5. Classified Information Bracketed
6. Other (Specify):

Classification changed to
Unclassified
(Insert appropriate classification level and category)
by authority of Y/SA-858 7-29-94
(Authority for change in classification) (Date)
by Audrey D. Windham 8-10-94
(Signature of person making change) (Date)
Verified by R J Fraser 8-10-94
(Signature of person verifying change) (Date)

APPROVED FOR PUBLIC RELEASE
12/2/94
Technical Information Office Date

MMES QA
Y-12 Classification Office
Name: LS Mullen
Date: 11-10-94

DOE-OR QA
Malcolm Theisen
Analysis 5-23-94
Date

RESTRICTED DATA
This document contains Restricted Data as defined in the Atomic Energy Act of 1954. Unauthorized disclosure subject to Administrative and Criminal Sanctions.

Derivative Classifier
5/19/95
Date

L. L. McCauley
Sr. Staff Manager
HSEA Div.

UNCLASSIFIED

~~CONFIDENTIAL~~

1965 APR 19 AM 10 19 [redacted]

(668) Hg Theft

Y/TS-1630

To W. H. Henderson, Director of Finance

April 13, 1965

not in 1900s

From F. O. Christie, Chief, Audit Branch

Christie 1965

PHYSICAL AND ACCOUNTING CONTROLS OVER MERCURY AT Y-12

AFA:GLL

RUSSELL

As requested by Mr. McCauley and in conjunction with our current audit of controls over removal of materials and property, we have reviewed the physical and accounting controls over mercury at Y-12. Our findings are summarized below:

Summary of Findings

1. Mercury is located in Buildings 9201-4 and 9201-5, flask storage outside Building 9201-5, sludge pits and tank near Buildings 9201-4 and 9201-5, recovery facility, and loading ramp at Building 9720-5. All locations are within the Western Exclusion Area, except the recovery facility which is within the perimeter fence.

2. Accessibility to locations is unlimited to anyone cleared to enter the Western Exclusion Area. Material can be withdrawn at numerous points in the system without difficulty. Many leaks exist in the systems in Buildings 9201-4 and 9201-5.

3. The flask storage is accessible by sedans, high-lifts or pickup trucks; large trucks appear to be precluded from entry by locked chains over the entrances. One Dempster Dumpster which is removed once a week from the storage yard provides an excellent vehicle for unauthorized removal of material for later pickup. Many pallets, containing 25 flasks, were not bound with metal bands or tightened with wedges. It would be possible to remove the individual flasks or to remove from the flasks the impact wrench-tightened plugs, drain the material and replace the plugs undetected.

4. We received two different explanations of the method used to determine the number of flasks filled on each shift. The initial explanation indicated that the determination is made on a "by difference" count of empty pallets without an actual count of filled flasks. A subsequent explanation indicated that an actual count was made of filled flasks. The records kept by the foremen, constituting the inventory control records, contain quantitative changes which could not be explained. The persons keeping the records also have the responsibility for taking the physical inventories of flasked material in storage and production and reconciling to the book quantities.

[redacted]

5. We were told by the Head of the Guard Department that periodic gate checks of brief cases, lunchboxes and packages are routinely confined to the day shift only. Outgoing vehicles are not examined unless the guard becomes suspicious.

6. Shipment data, including carrier, route and destination is available to many people within and outside Carbide.

7. We were advised that the Stores Department did not identify the pallet or flask numbers on shipments to customers. This precludes accountability and tracing, and defeats the purpose of these numerical controls. We understand that since April 5 the records are being documented to provide these controls.

8. We were informed that inventories of flasked mercury in storage are normally taken every Friday on the evening shift. We also were told that normally these counts are made without removing the tarpaulins which cover some of the material. A physical count of the material on hand at March 18, 1965, by us and Carbide representatives, showed an overage of 1 pallet containing 25 flasks. The records were adjusted. A contractor inventory on March 31, 1965, disclosed a shortage of 1 pallet of 25 flasks. A reinventory of a selected area on April 7, 1965 (requested by Y-12 representatives), in which we participated, disclosed the same quantity shortage. Representatives of Y-12 agreed that our March 18 inventory was correct. To date, the contractor has been unable to account for the apparent shortage.

Details of Findings

1. Locations of Materials and Physical Safeguards

The material is located in Buildings 9201-4 and 9201-5, flask storage outside Building 9201-5, sludge pits and tanks, recovery facility (Building 81-10), and the loading ramp at Building 9720-5. We understand that there are no other storage locations at Y-12.

Building 9201-4

This building is on standby status and is not regularly occupied. The doors are not locked; the building may be entered by anyone in the Western Exclusion Area. The mercury can be withdrawn from the system at many locations. We noted leaks in tanks, pipes and around pumps; at some leaks, buckets had been placed to catch the mercury. In others it is on the floors, occasionally in large puddles.

Building 9201-5

This building, the location of the flasking operation, is normally occupied on a two shift basis (7:00 a.m.-3:00 p.m. and 3:00 p.m.-11:00 p.m.) five days a week. This building is accessible during the off-shift, and material can be easily withdrawn from many points in the system. The leaking conditions described for Building 9201-4 are also in evidence at this location. In one pit the floor is completely covered.

Flask Storage Yard

The flask storage yard is located outside Building 9201-5 and is not fenced except that it is within the Western Exclusion Area. Chains are locked across each vehicle entrance; these appear to prevent only large trucks from entering the yard. Due to the physical layout and terrain, it is possible for sedans, high-lifts or pickup trucks to enter the yard without passing through the chained entrance points. Two Dempster Dumpsters are located inside the yard. We were informed that one is picked up once a week for dumping; the other, filled with empty flasks, has not been moved since last summer. Our survey of the yard disclosed that many of the pallets, which hold 25 flasks, were not bound with metal bands or tightened with wedges. The flasks currently are being so secured. Threaded plugs are tightened with impact wrenches to seal the flasks. It was impossible to visually ascertain if these plugs have been removed and replaced. The flasks are now being serially numbered with metal dies at the request of the FBI. This is being done after they are filled and placed on pallets.

Sludge Pits, Tanks and Recovery Facility

There are two open top sludge pits and one tank. One pit is outside the Southwest corner of Building 9201-4; a tank and pit are located outside the same corner of Building 9201-5. In the latter case, the material passes through the tank and into the pit. The tank has no operable outlets. Both pits contain a large amount of water and sludge and some mercury. This sludge must be burned to recover the mercury. We were told that both pits, the tank, and the recovery facility, Building 81-10, contained approximately 75,000 pounds of recoverable mercury at June 30, 1964. We understand that, at present, an undetermined quantity of this sludge is still in Building 81-10, to be processed.

[redacted]

Building 9720-5

At the time of our inventory count, there were 156 flasks stored on the loading ramp at Building 9720-5. This building is in a remote location, in the Southwest section of the Western Exclusion Area. The pallets located here were not adequately banded; there were six loose flasks, not on pallets. Although we did not weigh these flasks, we believe them to be filled because of their weight, manually tested. The flasks have since been removed to an undetermined location and been replaced by 87 new serialized flasks.

2. Flasking Operation

a. The following tabulation shows the history of the flasking or withdrawal operation in Building 9201-5 which started on July 13, 1964, and is the responsibility of the Arc Melting Department of the Metal Preparation Division.

Dates	Shifts
July 13, 1964	1 shift (8 a.m.-4:30 p.m.)
October 5, 1964	2 shifts (7-3 p.m.; 3-11 p.m.)
October 14, 1964	1 shift (3 p.m.-11 p.m.)
November 30, 1964	2 shifts (7-3; 3-11)
December 8, 1964	Shutdown-awaiting AEC/GSA decision as to whether to use only reconditioned flasks.
January 7, 1965, to date	2 shifts (7-3; 3-11)

b. The mechanics of the withdrawal operation are described briefly, as follows. The material flows from the Building 9201-5 columns or main storage tanks into a series of 4 interconnected tanks. It then flows into 2 interconnected tanks on into a single header tank. From the header tank, the flow is channeled into a loading station. All of these units are located inside Building 9201-5. The loading station sits on scales which have been "zeroed" to compensate for the weight of the loading station. The loading container is filled; any excess over the scale reading of 76 pounds is forced out of the station back into the drain system. The flask is then filled and a threaded bolt, inserted in the flask, is tightened with an impact wrench. The flasks are then loaded on a 25-flask capacity pallet; the full pallets are banded with metal bands. Wooden wedges are inserted between the flasks to tighten the load. Currently,

[redacted]

serial numbers are then stamped on the flasks with metal dies and the pallets are also numbered. Initially the pallet numbers were painted on the pallets or two by fours on top of the flasks. Currently, a two piece prenumbered card is used which also shows the serial numbers used on the flasks. One section of the card is stapled on the pallet; the other is retained in Arc Melting as a permanent record. These pallets are normally left inside Building 9201-5 for approximately 24 hours so that leaks may be detected. They are subsequently moved to the storage yard outside 9201-5. In spite of this precaution, we noted on March 29 that several flasks stored in the yard appear to be leaking. This could be a residue from a previous "leaker" although it appears to be fresh. We were told by one representative (confirmed by the supervisor of Arc Melting) that the number of flasks filled is determined by the shift foreman in the following manner. The empty pallets at the flasking point at the beginning of a shift are counted. They are also counted at the end of the shift. The number of flasks filled is computed by taking the difference between the two "empty pallet counts" and multiplying it by 25, the capacity of a pallet. If there are any partially filled pallets, the flasks are counted individually and added to the computed quantity. Since our initial discussions both foremen stated that they actually count the filled flasks. The total is recorded in a "Bottling Record Book" which is maintained by the foremen, and constitutes the inventory record of bottled mercury on hand at the Arc Melting Department (includes storage yard). Transfers of custody, supported by an approved transmittal form (receipted by the recipient), are deducted from the inventory record. These transmittal documents are prepared at the time of loading of the carrier or at the time of transfer to the Materials Department. As of January 8, 1965, the foreman started keeping a supplemental record (Foreman's Log) of each shift's operation. Notes are made in this log such as, flasks sent to K-25 for reconditioning, flasks filled, etc., and any problems encountered on the shift. We were told that the log is posted for flasks filled after the inventory record is posted.

c. Our review of the "Bottling Record Book" (inventory record) and the Foreman's Log disclosed the following:

(1) On August 20, 1964, the inventory record was changed from 424 flasks filled, to 418.

(2) On January 8, 1965, the Foreman's Log showed that the 3-11 p.m. shift filled 200 flasks; the inventory record originally read 200 but was changed to read 225, in the shift column and the "filled to date" column. We were told that during the December

shutdown, 25 flasks were filled for display purposes and were not recorded on the inventory record. We were advised that this accounts for the difference.

(3) On January 13, 1965, the Foreman's Log showed that the 3-11 p.m. shift filled 300 flasks; the first digit appeared to have been changed. The inventory record showed 300 as the number filled on that shift. Another section of this inventory record, the section used for labor distribution purposes, was changed from 400 to 300 flasks.

(4) For January 15, 1965, the Foreman's Log and the inventory record showed that the day shift filled 455 flasks; this had been originally recorded as 450 on both records.

(5) On February 26, 1965, the Foreman's Log (evening shift) showed 437 flasks filled; the inventory control record was increased to 488.

(6) On March 12, 1965, the Foreman's Log and the inventory record were changed from 355 to 375.

We were unable to obtain explanations for these changes from Carbide. The days we selected were all on Friday, the day of the weekly inventory taken by the evening shift except for January 13, 1965, and August 20, 1964. We were informed by a representative of Arc Melting that some of the changes may have been made to bring the record in agreement with the weekly count. If this is the case, the inventory records are of little use as a control device.

3. Checks by Security Forces and Escort Duty

We were advised that Buildings 9201-4 and 9201-5 are checked by guards twice on the 3-11 p.m. and 11-7 a.m. shifts. We were also informed that it is policy to make two gate checks per week, usually limited to the day shift only, at each of the manned portals and roto-gates; lunchboxes, brief cases and packages are examined, but outgoing vehicles (Government or otherwise) are not unless the guards become suspicious. Carrier vehicles are escorted by guards to stores; stores personnel escort carrier to loading site, loads material and returns with carrier to stores. The guards escort them back to the exit portals.

[redacted]

On March 25, 1965, during the evening shift, we observed the storage location and the Bear Creek Gate and parking lot. At 10:10 p.m. a pickup truck containing 2 men exited Bear Creek Portal; the truck was apparently not examined by the guard. The men drove to West Portal where they transferred three private cars from the northern extremity of the lot to locations near the exit portals, presumably for their own and/or others' convenience. At no time were they challenged by UCC guards. This occurred at the identical time on March 29 and involved the same private vehicles. While there was apparently no removal of material, in these instances, these observations demonstrate the simplicity by which Government property could be removed from the plant and transferred to private vehicles, and the possible misuse of Government time and a Government vehicle.

4. Shipping Practices

Our review disclosed that in many instances the transferee designates the carrier or picks up the material in his own equipment. In some instances, the transferee directs that the most economical method is to be used; in these cases, Carbide selects the carrier. We also note that shipping data is available to many people. For instance, in cases of shipments to DHEW, personnel of the following would have knowledge of the carrier to be used (in some cases), destination and quantities:

a. State organization (recipient of material)

b. DHEW

c. GSA

d. AEC-Oak Ridge

e. Carbide

(1) Materials Control Department and Materials Department Head

(2) Shipping and Receiving Department

(3) Arc Melting Department

f. Carrier

[redacted]

We noted that in most instances, the shipment dates were not specified by the transferee. In these instances, the dates were scheduled by Carbide; therefore, it would appear that only those persons within Carbide and the carrier organizations would have knowledge of the shipment dates; approximately 3 to 4 days later, AEC personnel would have the data due to receipt of a copy of the shipping document.

We were advised that the Y-12 Shipping Department did not identify in the records of shipments the pallet or flask numbers. This practice precludes accountability and tracing, and defeats the purpose of these numerical controls. We understand that currently the pallet and flask numbers are being identified on these records.

5. Physical Inventories of Material in Storage

It is the normal practice to take a physical inventory of material in storage at the Arc Melting Department each Friday on the 3-11 p.m. shift. We were told that generally the portion of the material covered by tarpaulins is counted without removing the tarps. This inventory is made by the shift foreman. The records, although containing changes and erasures, do not identify any of such changes as inventory adjustments prior to March 19, 1965.

On March 18, 1965, we counted the material at the Arc Melting Department; our count (made by two auditors, independently), disclosed an overage of 1 pallet containing 25 flasks. A recount was immediately made by us (again, by two auditors independently) and the foreman on duty, who also counted independently. The overage remained and was agreed to by the foreman. The foreman coming on duty with the 3-11 p.m. shift, when advised of the overage, also counted the material. We were subsequently advised that his count produced the same result as the previous counts that day. Accordingly, the inventory record was adjusted, on March 19, 1965, to include the overage. Our physical inventory included the test weighing of 6 pallets of mercury flasks. Due to the existing weight variances of refurbished and old flasks, it was impossible to determine precisely the weight of the mercury contained in the flasks in each pallet; however, it appeared to be within reasonable limits. In view of the March 18 count, Carbide did not perform the usual physical inventory on March 19. We were advised that on March 26, the evening shift foreman started the usual physical inventory but, since his counts produced large differences, he decided not to continue attempts

[redacted]

(676)

[redacted]

to count. Since this usual inventory was not completed on March 26, we were advised that an inventory was taken on March 31, 1965. This count, by Carbide, disclosed a shortage of 1 pallet containing 25 flasks. We were requested by Carbide to meet with their representatives on April 6, 1965, to attempt to reconcile our count of March 18 with theirs of March 31, 1965. Such a reconciliation was impossible because our count was by location and Carbide's was tabulated by new and old flasks without reference to location. In addition, undocumented transfers between locations had occurred. At this meeting, the Carbide representatives expressed doubt as to the accuracy of the March 18 counts including the counts by both foremen. They were prepared to agree that both foremen who counted, in conjunction with us, on March 18 had made mistakes. They also were confident that their production (and their physical inventory of that production) recorded on March 19 was accurate. They displayed several calculations which were predicated on what a certain foreman "remembered" about his counts on both March 18 and March 19, 1965. These undocumented "recollections" indicated the possibility of an error in our count of March 18. Carbide stated that they would take an inventory of the storage yard on April 7 since they were convinced that the March 18 counts at that location were in error. They informed us that only 10 pallets had been moved from this area for stenciling since March 18 and that these had not yet been returned. They calculated a difference of 11 pallets in the storage yard (ten of which had been moved inside). They felt that a new count would show a difference of 11 and thus prove that the counts on March 18 were inaccurate. On April 7, there were 4 independent counts made of the storage yard, two by AEC and two by Carbide representatives. Each count agreed by location in the yard and by old and new flasks. The difference disclosed, however, was 10 rather than eleven pallets, as reconciled to the counts of March 18. The ten pallet difference represents those which were placed inside Building 9201-5. The contractor agreed that the counts made on March 18 were accurate and that the recorded overage adjustment made on March 19 was appropriate. Further, they agreed that this adjustment was in no way connected with the current shortage.

F. O. Christie

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Chemical Week
JUNE 12, 1965

Mercury Means Larceny

Soaring prices set off wave of mercury thefts

NEWARK NEWS PHOTO

Detectives examine drums containing seven tons of stolen mercury.

In Newark, N.J., this week police and FBI agents are investigating three recent robberies in which more than $350,000 worth of mercury was taken from local manufacturing and warehousing units.

In nearby Hawthorne two men are under arrest in connection with an attempted theft of $130,000 worth of mercury from Metalsalts Corp.

In Cleveland the FBI and police are investigating the disappearance of 7,000 lbs. of the liquid metal—about $64,000 worth—from an industrial plant, and trying to get a lead on a series of thefts that has been draining mercury from Case Institute of Technology labs for the past seven months.

In Chicago police are looking for a man who used forged credentials to get into a locked and guarded Consolidated Freightways terminal. He drove off with a trailer containing 28,000 lbs. of federal-government-owned mercury, then worth $126,000.

Chicago police suspect that the theft was the work of a nationwide ring of thieves, highly organized and specializing in metal thefts. Hawthorne, N.J., police speak of a Mafia-type operation, point out that the smooth work by robbers there and in Newark —e.g., use of walkie-talkies, rented trucks chosen according to the weight of the anticipated mercury haul—bespeak no amateur criminals.

In short, mercury has become prime loot for the underworld, and chemical companies that use and deal in the metal are being forced to take a new look at security—and sources.

Reasons for quicksilver's attractiveness as booty aren't hard to spot. In the last two years its price has about quadrupled—from about $180 for a 76-lb. flask in '63 to well over $700 last week. And published prices are largely nominal; there's virtually no mercury to be had. Quoted tabs for a flask are rising $50-75/week. Some few that have mercury are speculating, holding onto the metal to see how high the price can go. So far, there seems to be no limit.

In Europe, prices are approaching $800/flask; dealers in the eastern U.S. are paying premium prices for any mercury they can lay their hands on, selling it across the Atlantic; and speculation is rife that much of the quicksilver being stolen here is similarly going abroad.

Eating It Up: U.S. consumption of mercury in '63—complete figures for '64 aren't in yet—amounted to nearly 78,000 flasks, up from 51,000 in '60. Domestic production in '63 was 19,000 flasks, with imports accounting for most of the difference. Biggest foreign producers are Spain and Italy.

Most important U.S. uses in '63, according to the Bureau of Mines: electrical apparatus (11,000 flasks); mercury-cell production of chlorine and caustic soda (8,000); antimildew paints (6,400); industrial instruments (5,000); pharmaceuticals (4,000); "other" uses (23,000).

The "other" category is the joker,

for it covers one of the biggest and fastest-growing applications; new chlorine-caustic plants. The Bureau of Mines' 8,000-flask figure for chlorine-caustic covers only the mercury consumed in operation of existing plants; but a single new, 100-tons/day unit may take more than 1,500 flasks of quicksilver for its initial charge at startup.

The Chlorine Institute (New York) now lists 17 new chlorine-caustic plants due onstream in the U.S. by Dec. '66 and six that are being built in Canada. Among the new domestic plants, eight will use mercury cells, two will have diaphragm units. The type of cell chosen for the seven others hasn't been disclosed. Five of the Canadian plants will employ mercury cells.

Staying Tight: California, the leading mercury-mining state, turned out 13,600 of the 19,000 flasks mined in the U.S. in '63. Estimates of total U.S. production and demand in '64 hover around 14,000 and 63,000 flasks, respectively, indicating that the '63 gap will be perpetuated even in the face of decreased consumption.

Right now, in fact, there is little hope in market quarters for any increase in available supply, or for a pause in the dizzying climb of mercury prices.

Neither Italy nor Spain is offering mercury for sale: '65 production has been committed to established buyers, and offerings of '66 production won't begin until the two countries have firmed up predictions of '66 output.

U.S. miners generally have been reluctant to reopen old mines or search out new ones because prices and demand are running wild. California's Division of Mines and Geology estimates '64 production in that state at only 10,000 flasks—down 3,600 flasks from '63—and looks for only a slight increase, if any, in '65. In '64 the state had 12 mines producing 10 flasks/year or more.

California's biggest mercury-mining year was '60, when 18,800 flasks were produced. Since then the figure has steadily declined.

According to the mines and geology agency, the fall-off is attributable to the depletion of known ore bodies, a period of relatively fixed mercury prices early in the decade, and increases in the costs of mining and exploration.

Because of these factors, the agency says, California miners have become highly selective, taking only ore that contains at least 12.8 lbs. of mercury per ton. In '59 they were able to turn a profit on 8.6-lbs./ton ore.

So far, rising mercury prices have failed to produce new stocks of metal, though some interest is evident. Development work on some 20 new mines was reported in California last year, but many of these were, or are, weekend operations.

Two months ago New Idria Mining and Chemical Co. (Idria, Calif.) said it would start working an extensive deposit of low-grade ore by open-cut techniques. While this is a clear indication of germinating interest in new operations, it would take dozens of such projects to make a significant change in the market picture. And so the current rash of thefts seems likely to continue.

Ubiquitous Nuisance: While major mercury robberies such as those in Newark and Chicago are definitely a sign of the times, thefts of small amounts have long been common in oil fields, college labs and other sites where the metal is used in meters and gauges. A Bakersfield, Calif., sheriff compares it to shoplifting, says most thefts from oil fields in his area involve mercury worth $50-350.

Houston sources say the frequency of thefts there pretty closely parallels fluctuations in demand—both foreign and domestic—for the metal. Not surprisingly, mercury pilfering has recently been on the upswing in Texas, Oklahoma and New Mexico.

A few days ago lawmen in Pampa and Borger, Tex., rounded up thieves who later confessed to a lengthy string of quicksilver robberies. Texas law stipulates that anyone who has more than 5 lbs. of the liquid metal in his possession and can't produce a bill of sale or other evidence of legitimate acquisition can be charged with theft. Most other states—e.g., California—require that the thieves be caught in the act. Mercury theft in Texas is a felony, carrying a two- to five-year sentence.

Oil fields are especially vulnerable because they are often unattended for long periods. Stealing meter mercury is simple, and almost anyone who has worked a while in an oil patch can do it.

The thief usually uses a car or truck fitted with heavy-duty springs, and can drive up to as many meters as he wants to plunder. Each meter—usually recording flow rate or pressure of oil or gas—contains about 7½ lbs. of mercury, which can be drained out in one of two minutes.

The sophisticated thief's choice for carrying his loot: a plastic household bleach bottle, which is easy to carry and will expand a bit as the heavy liquid pours in. Robbers used to favor threaded pipes with capped ends in which to carry their booty.

Because the meters contain clocks, which stop when the mercury is withdrawn, lawmen can precisely determine the thief's route through the field.

The thief in the Southwest usually fences his loot to dealers in used mercury. Although trading in used quicksilver is a legitimate business, some Texas dealers are taking advantage of stolen stocks. They can count on avoiding trouble even if discovered, since conviction requires proof that they knew the material to have been stolen.

The fence's profit usually is enormous. Humble Oil & Refining Co. (Houston) tells of one case in which a thief took mercury worth $5,000 from the company, sold it for $500. The fence promptly marked it back up to full market value. In both Texas and New Mexico thieves usually cross state lines to peddle stolen mercury.

Not So Smart: Less sophisticated thieves sometimes trip themselves up when trying to dispose of their loot. Case in point: a robbery late last year in San Francisco. A San Jose cook was convicted of receiving stolen goods after an attempt at selling 15 flasks of stolen mercury back to the company that had lost it—Precision Chemical Co., maker of mercurial pigments. Company officers became suspicious because of the prospective seller's eagerness to trade at something below market price, and because he spoke in terms of pounds—rather than flasks—of the metal.

Although law-enforcement and industry sources believe that much stolen mercury is being sent to Europe, there seems to be little real proof of this. And there's certainly no lack of a domestic market for "hot" quicksilver.

One Eastern user says his firm already has been burned in dealings with new mercury sources that turned out to be shady characters.

Such deals with irregular prospective vendors, the same source notes, almost always fall through. Either the vendor fails to come up with the promised mercury, or he demands a higher price for delivery than had first been agreed on.

The FBI has had mercury users and distributors on alert for several months for unusual offerings of mercury, whether new or used.

Most mercury users say they began tightening plant security some months ago, when quicksilver prices began skyrocketing, and have reviewed precautions as the frequency of mercury thefts climbed.

On Guard: Oil-field operators have tried several measures for protecting their meters, but to little avail. It's too costly to post guards; and locks on meter boxes yield readily to bolt cutters. Some firms have tried adding tracer chemicals to their mercury so it could be identified when recovered. But while this may help with convictions, it's a meager preventive measure.

Three months ago Chicago police set up a special 20-man metal-thefts detail. In the 18 months preceding establishment of the squad, metals worth about $1.5 million had been stolen in metropolitan Chicago. None of the material—including mercury, zinc, cadmium silver bullion, nickel and copper—has been recovered, but no big metal thefts have been reported in the area since the special detail went to work.

Among its duties: maintaining surveillance of smelting plants and dealers' warehouses from unmarked cars, especially in early morning hours and weekends.

According to members of the detail, plant managers can help discourage metal thefts in at least three ways:

(1) Run closer checks on callers who present themselves as inspectors. The Chicago lawmen say they have found businessmen are often naive, will believe too readily a person who proposes to inspect fire equipment, alarm systems, etc.

(2) After working hours, immobilize wheeled equipment (e.g., forklifts, trucks and dollies). Keep cutting torches locked up.

(3) Install and maintain an adequate burglary-alarm system, equipment that some plants still lack.

MCA's Gottshall, ICI's Chambers: amicable adversaries on 'Red' trade.

MCA Hears Policy Dissent

"We feel that we have less to fear from a fat Communist than a lean one." Thus did Paul Chambers, chairman of Imperial Chemical Industries Ltd. (London), succinctly sum up his dissent from the Manufacturing Chemists' Assn.'s official stand against selling plants and technology to Iron Curtain countries.

Chambers—a small, energetic man somewhat reminiscent of empire builder Benjamin Disraeli — was Daniel in the Lion's Den; for he voiced his controversial views at the MCA annual meeting, where close to a thousand registrants from 176 member companies had gathered under dark and drizzling skies at The Greenbrier, White Sulphur Springs, W.Va. He was introduced by MCA Chairman Ralph Gottshall, chairman and president of Atlas Chemical Industries.

No Fear of Market Flooding: In his speech Chambers took issue with MCA's contentions that sale of plants and know-how would (1) adversely affect the U.S. economy; (2) expedite Soviet industrialization; and (3) permit diversion of Soviet scientists and technicians from civilian to military research.

Citing the Soviet's lack of marketing expertise, Chambers attacked the second contention: "Until there is a much fuller recognition of the greater efficiency of competitive private enterprise in meeting consumer demand and the more general adoption of the methods of such enterprise, Communist countries will always be in a position of trying to catch up with Western countries but never succeeding."

Betting on Prosperity: If MCA members didn't wholeheartedly buy Chambers' arguments, they did buy economists' predictions of continuing prosperity. On this basis, they approved a '65-'66 budget pegged to higher predicted revenues on an unchanged percentage of member companies' sales.

In his report to the members, MCA President G. H. Decker noted that '64 sales of chemicals and allied products at $33.6 billion—9% above the preceding year's. "Every evidence we know of," he continued, "points to a continuing upward trend."

The delegates also accepted the proposed slate of officers and directors. Incoming chairman is Robert Semple, president of Wyandotte Chemicals.

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Compliance, Planning, & Resources Department

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